CYCLODEXTRIN NEWS

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Smart People with Smart Polymers from Organic Macromolecular Chemistry Group of Saarland University

The editorial of CDN pre-symposium issue was dedicated to the German scientists and cyclodextrin technologists.

This post-symposium issue of CDN is to thank *Prof. Wenz*, the Organizer and Chairman of the 17th International Cyclodextrin Symposium and his team for the excellent organization, for the high level scientific environment and for the kind hospitality. (Some of us thank Gerhard for the exhausting physical exercise during the first day's excursion and for the unforgettable climbing on the last day at the industrial historic place at Völklinger Hütte together with culinary adventures.) Our host at the Saarbrücken Symposium, has been playing a world-wide recognized role in the chemistry, the synthesis of cyclodextrins and their derivatives, polymers, rotaxanes as well as their applications.

The successful symposium with more than 200 participants from all over the world has been a special and really stimulating event giving platform to the most sophisticated supramolecular structures useful for many applications from catalysis to pharmaceuticals, food and environmental field.

Speaking of the German Cyclodextrin scientists, Prof. Gerhard Wenz has a distinguished recognition, since he is today one of most decisive and influential chemists among German Cyclodextrin scientists.

Gerhard has been working in the field of CDs for over 25 years. In the beginning, he worked at the Max Planck Institute für Polymer Forschung in Mainz, on the synthesis and characterization of series of lipophilic CD derivatives. Per-O-pentylated CDs, like heptakis (2,6-O-dipentyl)-αCD, and (2,3,6-O-tripentyl)-αCD as well as the corresponding βCD analogues have been synthesized. He then collaborated with Prof. König (in Hamburg) by sending his per-pentylated CD derivatives for enantioselective gas chromatography. This fruitful co-operation of the organic chemist and the chromatographer, soon resulted in the design and commercialization of Lipodex® columns for enatioselective gas chromatography. The Macherey-Nagel company patented [1] these CD-enabled GC columns and now offers six different Lipodex GC capillary column products for enatioseparation.

Another patented discovery made by Prof. Wenz and colleagues is the synthesis and utilization of 2,6-di-O-butylated-3-O-acetylated CDs as catalysts for cyanoacrylate adhesives.[2] The

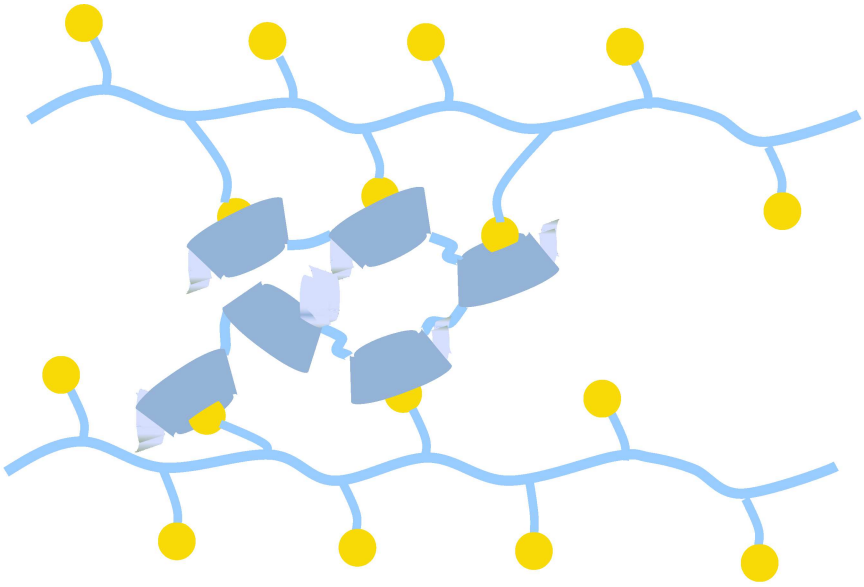
ethyl-2-cyanoacrylate which contains about 0.2 wt% of heptakis (2,6-di-O-butyl-3-O-acetyl)-βCD was used to bond SBR rubber with highly accelerated binding and shortened setting time (See Henkel's Loctite glue products).

He wrote his first review on CDs as building blocks for supramolecular structures [3] and published his first results on the synthesis of cyclodextrin polyrotaxanes in Angewandte Chemie as early as in 1992 [4], the same year when the paper of Harada *et al*. on molecular necklaces appeared in the Nature [5].

Wenz at Karlsruhe (1992–2000)

The work in Karlsruhe was mainly devoted to cyclodextrin polyrotaxanes [6-9].

Furthermore the group synthesized the first self-organizing hydrogels by interaction of cyclodextrin polymers with guest polymers (Scheme 1) [10].



Scheme 1: Self-assembly of linear CD polymer and guest polymer with 4-tert-butylaniline moieties [9]

Wenz at Saarbrücken

In the year 2000, Prof. Wenz moved from Karlsruhe to Saarbrücken to University of Saarland, to become the head of Department of Organic Macromolecular Chemistry. Since then he has been conducting his research around smart polymers including also CD-based ones. The definition of these systems is given on the homepage of the group:

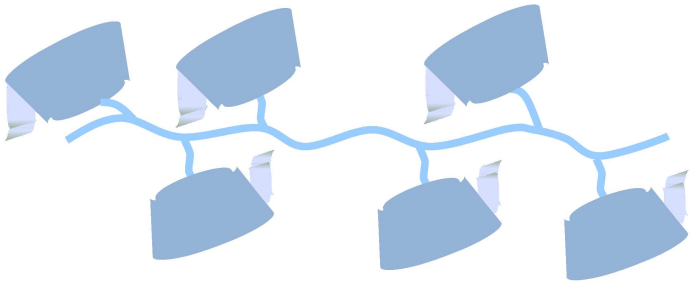
„**Smart Polymers** are functional materials with properties switchable by external stimuli like temperature, pH, time, light, pressure, magnetic fields, electricity, or specific receptor-ligand interaction. Smart Polymers are often inspired by biological systems and mimic living bones, tissues, cells, viruses and so on. We are interested in specific functions and material properties ranging from switchable mechanic and tribologic properties to molecular transport functions, for example for controlled drug delivery. We start from the natural

polysaccharides **starch** and **cellulose** because they are renewable feed-stocks independent from fossilic oil and gas. Furthermore, polysaccharides show a very high structural definition and they are generally non toxic, biocompatible, and biodegradable." [11]

Among the about 100 CD-related publications (papers, conference proceedings and patents) of Prof. Wenz's research team filed in the Cyclodextrin News database on 18.06.2014 we can find 39 hits for "polymer" as a keyword, 12 for "polyrotaxanes", 10 for "supramolecular structures", 5 for "immobilization", etc. showing the main focus of the research. The 6 review papers on CDs as synthons [12], host-guest chemistry [13], molecular recognition [14] and on polyrotaxanes [15-17] are well cited.

The most recent results were demonstrated at the symposium. Some examples are as follows:

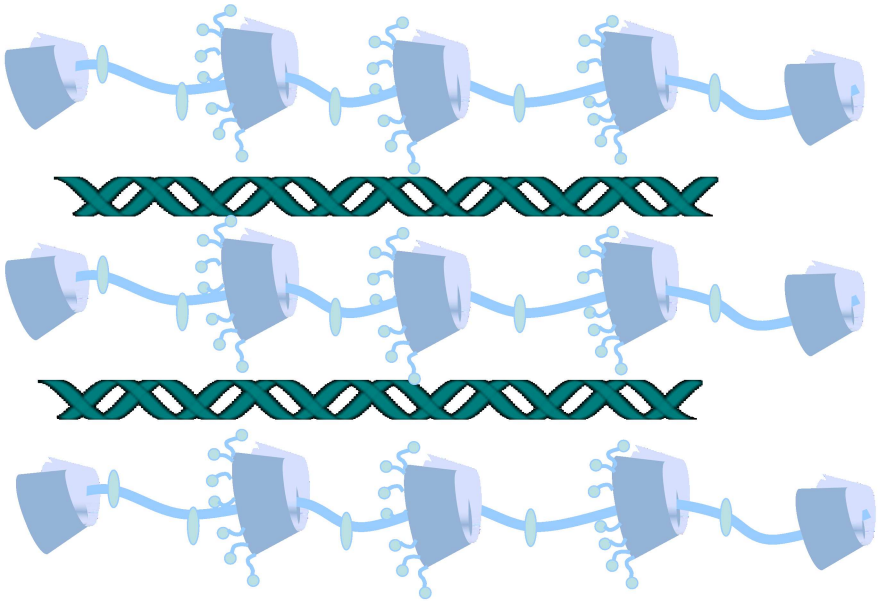
CD was conjugated to hyaluronic acid, a natural polymer of high biocompatibility and biodegradability. First mono-tosyl βCD was reacted with cysteamine hydrochloride to get amino functions and coupled to hyaluronic acid by 2-chloro-4,6-dimethoxy-1,3,5-triazine coupling agent (Scheme 2) [18].



Scheme 2: Hyaluronic acid modified with CD

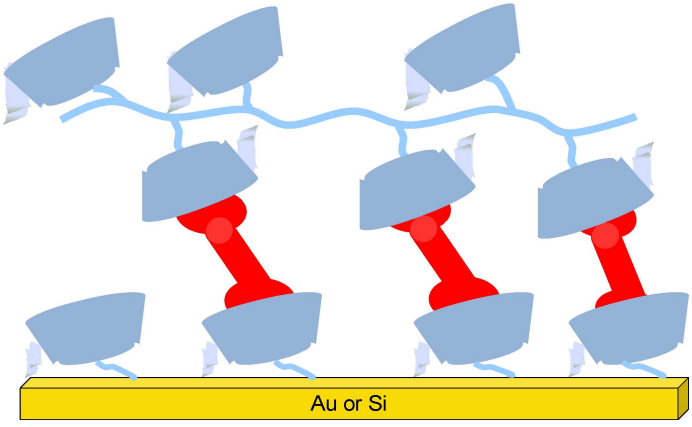
Amphiphilic 6-thioalkyl CDs –useful carriers for delivery of camptothecin– were prepared and complexed with the fluorescence dye BODIPY to get a promising system to visualize transport processes into living cells [19].

A sophisticated gene delivery system was worked out by self assembly: cationic CD polyrotaxanes were prepared by threading first a heptacationic βCD and then αCD on highly water-soluble ionic polymers with long spacer groups. These cationic polyrotaxanes were especially useful for gene transfection even superior to polyethylene imine (PEI) (Scheme 3) [20].



Scheme 3: Nanoparticles formed of polyrotaxanes of polycationic polymer with polycationic CDs (βCDs in the middle of the chain and αCDs at the end) forming polyplexes with the double helix of genes [20]

A molecular toolkit based on CD-modified surfaces, ditopic guests and CD polymers with stiff backbones was developed and utilized to measure the adhesion and friction forces between two CD layers (the CD-modified silicone surface and CD-functionalized tip of the dynamic single molecule force microscope) in the presence and absence of ditopic adamantane guests (Scheme 34) [21].



Scheme 4: Self assembly via complex formation with a ditopic guest (adamantane) forming a non-covalent link between the CD-modified surface and a CD-modified polymer [21]

Prof. Wenz's team has been regularly in the focus of scientific discussions at the International Cyclodextrin Symposia as shown by the 2 photos below.

Prof. Wenz with Dr. Buschman in 1996 in Budapest and with Dr. Szente in 2014 in Saarbrücken at the 8th and 17th International Cyclodextrin Symposia, respectively

References

1. Koenig, W. A.; Wenz, G; Lutz, S; Von der Bey, E.: Preparation of substituted cyclodextrins for resolution of organic compounds. *WO 8909235* A1 5 Oct 1989

2. Wenz, G.; Engelskirchen, K.; Fischer, H.; Nicolaisen, H. C.; Harris, S.: Cyanoacrylate adhesives. *DE 4009621* A1 2 Oct 1991

3. Wenz, G.: Cyclodextrins as Building Blocks for Supramolecular Structures and Functional Units, *Angew. Chem. Int. Ed. Eng.*, (1994), 33, 803–822

4. Wenz, G. and Keller, B.: Threading Cyclodextrin Rings on Polymer Chains, Angew. Chem. Int. Ed. Eng., (1992), 31, 197–199

5. Harada, A., Li, J., Kamachi, M.: The molecular necklace: a rotaxane containing many threaded α-cyclodextrins, *Nature*, (1992),. 356, 325–327

6. Herrmann, W., Keller, B., Wenz, G.: Kinetics and thermodynamics of the inclusion of ionene-6, 10 in α-cyclodextrin in an aqueous solution, *Macromolecules*, (1997), 30, 4966–4972

7. Krauter, I., Herrmann, W., Wenz, G.: Self organization of fluorescent molecular necklaces in aqueous solution, *J. Incl. Phenom. Mol. Recogn. Chem.*, (1996), 25, 93–96

8. Herrmann, W., Schneider, M., Wenz, G.: Photochemische Synthese von Polyrotaxanen aus Stilbenpolymeren und Cyclodextrinen, *Angew. Chemie*, (1997), 109, 2618–2621

9. Steinbrunn M. B. and Wenz, G.: Synthesis of water-soluble inclusion compounds from polyamides and cyclodextrins by solid-state polycondensation. *Angew. Chem. Int. Ed. Eng.*, (1996), 35, 2139–2141

10. Weickenmeier, M., Wenz, G., Huff, J.: Association thickener by host guest interaction of a β-cyclodextrin polymer and polymer with hydrophobic side-groups. *Macromol. Rapid Commun.* (1997) 18, 1117–1123

11. http://www.uni-saarland.de/en/lehrstuhl/wenz/forschung.html

12.Wenz, G.: Cyclodextrins as synthons for supramolecular structures and functional units. *Angew. Chemie* (1994), 106(8), 851-870

13.Wenz, G.: An overview of host-guest chemistry and its application to nonsteroidal anti-inflammatory drugs. *Clin. Drug Invest.* (2000), 19(Suppl. 2), 21-25

14.Wenz, G.: Recognition of monomers and polymers by cyclodextrins. *Advances in Polymer Science*, (2009), 222(Inclusion Polymers), 1-54

15.Wenz, G.: Keller, B.: Polyrotaxanes made by self-assembly of cyclodextrins on polymer chains. *GIT Fachz. Lab*. (1994), 38(6), 608, 611-12, 614

16.Wenz, G.: Han, B.-H.; Mueller, A.: Cyclodextrin Rotaxanes and Polyrotaxanes. *Chemical Reviews* (Washington, DC, United States), (2006), 106(3), 782-817

17.Wenz, G.: Cyclodextrin polyrotaxanes assembled from a molecular construction kit in aqueous solution. *Journal of Polymer Science, Part A: Polymer Chemistry*, (2009), 47(23), 6333- 6341

18.Markenstein, L; Wenz, G.: Conjugation of α-cyclodextrin to hyaluronic acid for controlled drug delivery. 17th International Cyclodextrin Symposium, 29-31 May 2014, Saarbrücken. Abstract book: 2-4

19.Becker, L.; Albrecht, M.; Wenz, G.: Amphiphilic 6-thioalkyl-cyclodextrins as transport systems for hydrophobic dyes. *17th International Cyclodextrin Symposium*, 29-31 May 2014, Saarbrücken. Abstract book: 2-30

20.Wenz, G.; Albuzat, T.; Keil, M.; Wichter, J.; Dandekar, P.; Jain, R.; Lehr, C.M.: Cellular delivery of polynucleotides by cationic cyclodextrin polyrotaxanes. *17th International Cyclodextrin Symposium*, 29-31 May 2014, Saarbrücken. Abstract book: 6-2

21.Albrecht, M.;.Bozna, B.; Blass, J.; Wenz, G.; Bennewitz, R.: A molecular toolkit based on cyclodextrin polymers for surface materials with switchable tribological functiones. *17th International Cyclodextrin Symposium*, 29-31 May 2014, Saarbrücken. Abstract book: 5-D

BIBLIOGRAPHY & KEYWORDS

1. CDs: Derivatives, Production, Enzymes, Toxicity

Sollogoub, M.

Up to 6 different functions on cyclodextrins: selective synthesis and applications in materials and catalysis

Targeting, Regioselective Debenzylation

Oral Presentation, No.: 1-A

Martina, K.; Cravotto, G.; Caporaso, M.; Calcio Gaudino, E.; Baricco F.; Berlier, G.

Efficient MW promoted synthesis of cyclodextrin-grafted nanomaterials: three examples of nanoscale multicarriers

CuAAC, Nonconventional Synthetic Methods, SWCNT, CD-Derivatized Silica

Oral Presentation, No.: 1-C

Bregier, F.; Karuppannan, S.; Chambron, J-C.

C3-symmetric cavitands from α-cyclodextrin and cyclotriveratrylene analogues

Hybrid Cavitand-Cyclotriveratrylene, Permethylated Cyclodextrin

Oral Presentation, No.: 1-D

Ling, C-C.; Cui, L.; Ghosh, R.; Zhang, P.

Synthesis and applications of cyclodextrin-based glycodendrimers

Chemoenzymatic Method

Oral Presentation, No.: 1-E

Goszczynski, T.; Gawlowski, M.; Girek, B.; Kowalski, K.; Girek, T.; Boratynski, J.

CD/protein conjugates. synthesis and chemical and biological properties

Reactions of 6-O-monoformyl-β–CD

Poster Presentation, No.: 1-01

Bonnet, V.; Nolay, F.; Djedaini-Pilard, F.; El Kirat, K.; Morandat, S.

Structure/activity relationship in new amphiphilic cyclodextrins as nano vectors

Reaction of Dioleylphosphite on Permethylated 6-Monoamino-6-monodeoxy-β–cyclodextrin

Poster Presentation, No.: 1-02

Manouilidou, M. D.; Yannakopoulou, K.

A cyclodextrin trimer as a triple hook for drug capture a highly efficient synthesis and characterization

Click Reaction, 6-Monodeoxy-6-N-monopropargylamino-β–cyclodextrin

Poster Presentation, No.: 1-04

Richardson, R.,; Choisnard, L.; Geze, A.; Levilly, D.; Charra, C.; Putaux, J-L.; Boullanger, S.; Wouessidjewe, D.

Microwave-mediated enzymatic synthesis of amphiphilic β-cyclodextrins used as building blocks for nanoparticles preparation

Thermolysin, Vinyl-decanoate, Enzymatic Reaction

Poster Presentation, No.: 1-05

Tuza, K.; Ramirez, C.; Legarra, S.; Fenyvesi, E.

Allyl cyclodextrin derivatives for preparation of sorbents for tertiary treatment of wastewater

Heptakis(β–O-allyl-2,6-di-O-methyl)-β–cyclodextrin, Heptakis(6-O-allyl-2,3-di-O-methyl)-β–cyclodextrin, Partially Allylated β–Cyclodextrin, Partially Allylated RAMEB

Poster Presentation, No.: 1-06

Couturier, C.; Dumarcay-Charbonnier, F.; Lambert, A.; Barth, D.; Marsura, A.

Capped guanidino-α-cyclodextrin synthesis based on intramolecular staudinger-aza-wittig (saw) reaction

SAW Reaction between Phosphinimide and Isocyanate Intermediate

Poster Presentation, No.: 1-12

Marquick, A.; Montero, V.; Winum, J-Y.; Montero, J-L.

New phosphonate based cyclodextrins

Regioselective AD-type Bis-de-O-benzylation, Artificial Enzyme

Poster Presentation, No.: 1-14

Dalmadi-Kiss, B.; Szeman, J.; Sebestyen Z.; Klebovich, I.; Szente, L.; Ludanyi, K.

Systematic study on HPLC-MS properties of substituted cyclodextrins and their dependence on buffer type and concentration

BCD, HPBCD, SBEBCD, RAMEB

Poster Presentation, No.: 2-12

Anconi, C.P. A.; Pereira, R. A.; de Almeida, W. B.; dos Santos, H. F.

Linked cyclodextrin associations: A theoretical study

CD-Based Nanotube, CDNT, Covalently Bound, Tail-to-tail Arrangement

Poster Presentation, No.: 2-39

Kurlemann, M.; Ravoo, B. J.

Towards the sequence-specific, multivalent molecular recognition of cyclodextrin oligomers

Small Peptides as Template, Synthesis of Cyclodextrin Sequences, Reversible Thiol-Disulfide Exchange, Thiolated α– and β–Cyclodextrin

Poster Presentation, No.: 2-23

Menuel, S.; Potier, J.; Hapiot, F.; Monflier, E.

Inversion phenomenon on cyclodextrin dimers how avoided the tumbling ?

Free 360 deg. Rotation, Tumbling

Poster Presentation, No.: 2-36

Trotta, F.; Caldera, F.; Cavalli, R.; Mele, A.; Ferro, M.; Castiglione, F.; Rossi, B.; Venuti, V.; Melone, L.; Punta, C.; Scalarone, D.

Hyper-branched water soluble β-cyclodextrin-based polymers

Values of Critical Dilution

Oral Presentation, No.: 3-C

Malanga, M.; Puskas, I.; Tuza, K.; Balint, M.; Jicsinszky, L.; Fenyvesi, F.; Kirejev, V.; Ericson, M.; Fenyvesi, E.

Synthetic strategies for the fluorescent labelling of epichlorohydrin and citric acid cross-linked cd polymers

Rhodamin, Fluorescein, Nitrobenzofurazane, Coumarin

Oral Presentation, No.: 3-D

Stade, L. W. ; Larsen, K. L.; Duroux, L.; Shimizu, K.; Hinge, M.; Kristensen, Peter K.; Gurevich, L.; Nielsen, T. T.

Grafting of β-cyclodextrin dextran polymers to SiO_2 surfaces: synthesis

6-Monoazido-6-monodeoxy-β–cyclodextrin, CuAAC

Poster Presentation, No.: 3-02

Girek, T.; Goszczynski, T.; Girek, B.; Boratyriski, J.

New approach to the polymerization reaction between CD and dicarboxylic acids anhydrides

Succinic Anhydride, Maleic Anhydride

Poster Presentation, No.: 3-05

Caporaso, M.; Rinaldi, L.; Calcio Gaudino, E.; Martina, Katia, M.; Cravotto, G.

Enabling technologies for selective CD functionalisation, synthesis of polymeric derivatives and CD-grafted materials

Mechanochemistry, Microvawe Assisted Synthesis, Ultrasound Activation, Flow Chemistry, [3-glicydoxypropyl]trimethoxysilane, Mesoporous Silica

Poster Presentation, No.: 3-06

Balint, M.; Malanga, M.; Puskas, I.; Fenyvesi, E.

Water-soluble methyl-β-cyclodextrin polymers: synthesis and fluroescent tagging

Epichlorohydrin, Citric Acid, Low DS Methylated β-Cyclodextrin, Hydrocortisone

Poster Presentation, No.: 3-07

Do, T. T.; Nielsen, R. B.; Holm, R.; Larsen, K. L.

Stabilization of channel type cyclodextrin crystals

Noninclusion Complex Forming Additives, Glyceraldehyde, Xylose, Glucose, Vitamin C

Oral Presentation, No.: 4-F

Do, T. T.; Nielsen, R. B.; Holm, R.; K. L. Larsen

Production of channel type cyclodextrin crystals by forced precipitation in organic solvents

Channel and Cage Crystalline Structure, Organic Solvent, Precipitation, Powder XRD

Poster Presentation, No.: 4-26

Jindrich, J.; Ling, C-C.

Tutorial about regioselective synthesis of CD derivatives

Mono-O-alkyl CD derivatives, Monitor Progress of Multiple or Per-6-substitution

Oral Presentation, No.: 7-C

2. CD complexes: Preparation, Properties in solution and in solid phase, Specific guest

Moretti, F.; Dumarcay-Charbonnier, F.; Marsura, A.

Synthesis and characterization of new bipyridyl-α-cyclodextrin coilands

Complexation Properties of Transiotion Metals

Poster Presentation, No.: 1-08

Altarsha, M.; Ingrosso, F.; Ruiz-Lopez, M. F.; Dumarcay-Charbonnier, F.; Barth, D.; Marsura, A.

The interplay of theory and experience for the development of cyclodextrins chemistry in supercritical CO_2

Self-closure ODF the Cyclodextrin Cavity

Poster Presentation, No.: 1-13

Dumanpay-Charbonnier, F.; Joly, J.-P.; Marsura, A.

New highly self-organized bis-cyclodextrin systems

Bis-Cyclodextrinyl-diazacrown-[2]cryptorotaxanes

Poster Presentation, No.: 1-16

Samanta, A.; Ravoo, B. J.

Stimuli-responsive self-assembly of soft nanomaterials based on cyclodextrin vesicles

Photoreversibe Cyclodextrin Vesicle, Superparamagnetic Iron Oxide Nanoparticle

Oral Presentation, No.: 5-C

Przybylski, C.; Blin, F.; Bonnet, V.; Jarroux, N.

Open the doors of a fine structural deciphering of cyclodextrin based polyrotaxanes with mass spectrometry tools.

MALDITOF Analysis, ESIMS, nanoESIMS/MS

Oral Presentation, No.: 2-D

Kida, T.; Iwamoto, T.; Asahara, H.; Hinoue, T.; Akashi, M.

Chiral recognitioin by cyclodextrin derivatives in nonpolar solvents

Heptakis(6-O-triisopropylsilyl)-β–cyclodextrin, (R)- and (S)-1-(1-Naphthyl)ethyl-amine

Oral Presentation, No.: 2-G

Zhang, S.; Zhang, D-L.; Wang, Y-F.; Li, B-J.

Reversible functional supramolecular materials formed by host- gust inclusion between small molecules

Polymer, Nanotube Modified β–CD, PEI-Oligomer Grafted Adamantane

Poster Presentation, No.: 2-09

Wang, J.; Wang, Y.; Zimmermann, W.; Sonnendecker, C.; Jin, Z.

Effect of derivatization on the cavity hydrophobicity of β-cyclodextrin

Solvents, Different Polarity

Poster Presentation, No.: 2-10

Ding, L.; Wang, Q.; Chen, Q.; He, R.; Lu, C.

Single maleonitriledithiolate modification makes β-cyclodextrin responsive to external chemical stimulus

Addition of Cu^{2+} Ion, Unlocked Conformation, Fluorescence

Poster Presentation, No.: 2-20

Gallois-Montbrun, D.; Le Bas, G.; Legrand, F-X.; Masson, S. A.; Prange, T.; Lesieur, S.

A highly hydrated α–cyclodextrin/1-undecanol inclusion complex: crystal structure and hydrogen-bond network from high-resolution neutron diffraction at 20 K

Head-to-head Dimer, Interstitial Water Molecules, Hydrogen-bonding Network

Poster Presentation, No.: 2-21

Kogame, C.; Kida, A., Toshiyuki; M.

Molecular recognition by cyclodextrin dimers in nonpolar solvents

Pyrene, Fluorescence, Heptakis(6-O-tert-butyldimethylsilyl)-β–CD, Heptakis(6-O-triisopropylsiIyl)-β–CD

Poster Presentation, No.: 2-24

Becker, L.; Albrecht, M.; Wenz, G.

Amphiphilic 6-thioalkyl-cyclodextrins as transport systems for hydrophobic dyes

HPBCD, RAMEB, BODIPY

Poster Presentation, No.: 2-30

Tonelli, A. E.

Restructuring polymers via nano-confinement with and without subsequent release

Coalescent Polymer, Extension and Separation of Guest Polymer Chain

Oral Presentation, No.: 3-E

Wang, P.; Gao, P.; Ye, L.; Zhang, A.; Feng, Z-G.

Mechanical properties, electrospinning performance and biodegradability of CD-based polypseudo- and polyrotaxanes synthesized *via* in bulk ATRP

tert-Butyl Methacrylate, PEG4000, Protein Adsorption, Repellency, Delayed Biodegradation

Oral Presentation, No.: 3-G

Kato, K.; Ito, K.

Molecular design of CD-based polyrotaxanes for controlled mechanical properties of slide-ring materials

Viscoelastic Relaxation, Rubbery State, Strain Hardening Behavior

Oral Presentation, No.: 3-I

Takahashi, K.; Takada, Y.; Uehara, H.; Yamanobe, T.

Modification of physical property of poly(L-lactic acid) by cyclodextrins

TRIMEB, Fracture Strain

Poster Presentation, No.: 3-01

Stoddart, J. F.

Extended metal-carbohydrate frameworks

Cyclodextrin/Metalorganic Framework

Oral Presentation, No.: 4-E

Teragaki, A.; Kida, T.; Akashi, M.

Preparation and properties of new cyclodextrin organogels

Hexagonal Nanostructures, sec-Butanol, SEM Image

Poster Presentation, No.: 4-21

Roux, M.; Bonnet, V.; Fajolles, C.; Djedaini-Pilard, F.

Nano insertion of cyclodextrins at biological membrane interfaces

Liposome Functionalization

Poster Presentation, No.: 4-28

Albrecht, M.; Bozna, B.; Blass, J.; Wenz, G.; Bennewitz, R.

A molecular toolkit based on cyclodextrin polymers for surface materials with switchable tribological functions

Dynamic Single Molecule Force Spectroscopy, Friction Force Measurement

Oral Presentation, No.: 5-D

Zhao, J.; Zhang, Y-M.; Liu, Y.

Multistimuli switchable polypseudorotaxane mediated by cyclodextrin and cucurbituril

α–Cyclodextrin, Azobenzene, Cucurbit[8]uryl, Charge Transfer, Naphthyl Group

Poster Presentation, No.: 5-02

Takashima, Y.; Kakuta, T.; Nakahata, M.; Harada, A.

Self-healing properties of supramolecular hydrogels formed by cyclodextrins and hydrophobic guest groups

Ferrocene, Redox Stimuli, CD-Adamantane Gel

Poster Presentation, No.: 5-04

Nakahata, M.; Takashima, Y.; Hashidzume, A.; Harada, A.

Redox-responsive supramolecular polymeric actuator based on host-guest interactions

Water-soluble Polymer Cross-linked with, Inclusion Complex, β–Cyclodextrin, Ferrocene, Artificial Muscle

Poster Presentation, No.: 5-06

Bozna, B.; Blass, J.; Hausen, F.; Albrecht, M.; Krings, J.; Wenz, G.; Ravoo, B. J.; Bennewitz, R.

A molecular toolkit based on cyclodextrin polymers for surface materials with switchable tribological functions

Friction, Adhesion, Azobenzene, Atomic Force Microscopy

Poster Presentation, No.: 5-08

3. CDs in Drug Formulation

Gooding, M. J.; Darcy, R.; O'Driscoll, C. M.

Synthesis of a flexible cyclodextrin toolkit for next-generation drug delivery

Coppercatalyzed Click Chemistry, PEGchains, Targeting polypeptides, polycations, siRNA

Oral Presentation, No.: 1-B

Bols, M.

Cyclodextrin derivatives as Michaelis-Menten catalysts in water.

Artificail Enzymes

Oral Presentation, No.: 1-F

Frings, A.; Wolschann, P.; Viernstein, H.

Solubility enhancement of nabilone by β-cyclodextrin and dimethyl-β-cyclodextrin inclusion complexation

Kneading, Supression of Oxygen Diffusion

Poster Presentation, No.: 2-03

Markenstein, L.; Wenz, G.

Conjugation of β-cyclodextrin to hyaluronic acid for controlled drug delivery

2-Chloro-4,6-dimethoxy-1,3,5-triazine, CDMT, Biodegradable Polymeric Backbone

Poster Presentation, No.: 2-04

Rudrangi, S. R. S.; Trivedi, V.; Alexander, B. D.; Wicks, S. R.

Preparation of econazole-cyclodextrin complexes using a single-step, organic-solvent-free supercritical fluid process.

RAMBE, HPBCD

Poster Presentation, No.: 2-17

Mendez, S. G.; Otero Espinar, F. J.; Zoppi, A.; Quevedo, M. A.

Complexation of benzoic acid and hippuric acid with β-cyclodextrin. experimental and theoretical studies

Ternary Complex, Benzoic Acid/β-CD/Glycine

Poster Presentation, No.: 2-18

Belica, S.; Stepniak, A.; Palecz, B.

Calorimetrical examinations of interactions between cyclodextrins and included copmaunds

Sertraline Hydrochloride, Tebuconalzole, MCPA, Water, Water/Ethanol Solution,

Poster Presentation, No.: 2-35

Olteanu, A. A.; Arama, C-C.; Monciu, C. M.

Investigation of cyclodextrin based nanosponges complexes with angiotensin converting enzyme inhibitors (enalapril, captopril, cilazapril)

Sulfobutylated β-Cyclodextrin, (2-Hydroxy)propylated-β-cyclodextrin, Nanosponge

Poster Presentation, No.: 3-09

Lima, A. C.; Puga, A. M.; Mano, J. F.; Concheiro, A.; Alvarez-Lorenzo, C.

Dexamethasone-loaded γ-cyclodextrin-dextran microspheres for bone regeneration

Photoisomerization, Biomimetic Superhydrophobic Surface, Cytocompatibility, Acrylamidomethyl-γ-cyclodextrin

Poster Presentation, No.: 3-11

Giglio, V.; Natile, G.; Intini, F.; Viale, M.; Aiello, C.; Vecchio, G.

β-Cyclodextrin polymers functionalized with folic acid as new delivery systems

Water Soluble Amino-β-cyclodextrin Polymer, Antitumor Treatment

Poster Presentation, No.: 3-12

Liu, Y.

Cyclodextrin-based supramolecular assembly as a platform for drug delivery

Targeting Delivery, Anticabcer Drugs

Oral Presentation, No.: 4-A

Li, N.; Zhang, H-Y.; Liu, Y.

Construction of cyclodextrin/gold supramolecular nanocluster and its targeted delivery of anticancer drug

Gold Nanoparticles Bearing Adamantane Moieties, Biotin Modification

Poster Presentation, No.: 4-01

Pourantru, P.; Millan, E. G.; Sanchez, E. S.; Otero Espinar, F.J.

pHEMA/Cyclodextrins hydrogels for controlled release of triamcinolone acetonide

Soft Contact Lens of Poly(hydroxyethyl-methacrylate)

Poster Presentation, No.: 4-03

Zerkoune, L.; Angelova, A.; Legrand, F-X.; Choisnard, L.; Geze, A.; Wouessidjewe, D.; Lesieur, S.

Particle solubilization of amphiphilic cyclodextrin nanospheres by a non-ionic detergent

Amphiphilic β-CD Derivatives with Decanoyl Alkyl Chains, Polysorbate 80

Poster Presentation, No.: 4-08

Gidwani, B.; Vyas, A.

Formulation and evaluation of PLGA nanospheres of cyclodextrin complexed alkylating agent for cancer therapy

Anticancer Drug, PLGA, Nanospheres

Poster Presentation, No.: 4-19

Iohara, D.; Umezaki, Y.; Anraku, M.; Uekama, K.; Hirayama, F.

Preparation of hydrophilic C60(OH)10/2-hydroxypropyl-β-cyclodextrin nano-particles as a new antioxidant

Ovedosed Injection of Acetaminophen

Poster Presentation, No.: 4-11

Iohara, D.; Anraku, M.; Uekama, K.; Hirayama, F.

Highly dispersible CEO nanoparticles by sugammadex under physiological conditions

Photodynamic Therapy, Photosensitizer

Poster Presentation, No.: 4-12

Geze, A.; Choisnard, L.; Bacot, S.; Perret, P.; Charrat, C.; Levilly, D.; Lancelon-Pin, C.; Soubies, A.; Ghezzi, C.; Putaux, J-L.; Riou, L.; Wouessidjewe, D.

Biodistribution of surface-decorated biotransesterified β CD-nanoparticles

Biosynthesized β-CD Fatty Acid Ester, PEGylated Phopsholipids

Poster Presentation, No.: 4-13

Melone, L.; Punta, C.; Ferro, M.; Castiglione, F.; Mele A.,; Canepa, F.; Lamura, G.; Lucarini, M.; Franchi, P.; Rossi, B.; Venuti, V.; Trotta, F.

Cyclodextrins functionalized with nitroxyl persistent radicals: synthesis, magnetic behaviour and applications

Paramagnetic Nanosponges, Spin Label

Poster Presentation, No.: 4-16

Wajs, E.; Caldera, F.; Trotta, F.; Fragoso, A.

Peroxidase-encapsulated cyclodextrin nanosponge immunoconjugates as signal enhancement tool in biosensors

Signal Enhancement Tool, Gliadin Antigen, Antibody, Enzyme-loaded Nanosponge

Poster Presentation, No.: 4-20

Bauer, R. A.; Varga, Zs.; Fenyvesi, E.; Zrinyi, M.

Preparation and characterisation of cyclodextrin cross-linked poly(aspartic-acid) gels

Metoprolol, Dopamine

Poster Presentation, No.: 5-09

Tabary, N.; Junthip, J.; Leclercq, L.; Chai, F.; Aubert-Viard, F.; Blanchemain, N.; Martel, B.

Dual cyclodextrin polymers based layer-by-layer coating

Cross-linking, Citric Acid, Epichlorohydrin, Gylcidyltimethylammonium Chloride, 4-tert-Butylbenzoic Acid

Poster Presentation, No.: 5-10

Blanchemain, N.; Chai, F.; Sobocinski, J.; Maurel, B.; Jean-Baptiste, E.; Vermet, G.; Tabary, N.; Degoutin, S.; Lyskawa, J.; Haulon, S.; Neut, C.; Hildebrand, F.; Martel, B.

In vitro and in vivo evaluation of cyclodextrin modified medical devices

Vascular Prostheses, Antibiotic, Visceral Surgery, Pain reduction, Coronary Surgery, Vascular Slept, Rat Model

Oral Presentation, No.: 6-B

Theodossiou, T. A.; Goncalves, A. R.; Aggelidou, C.; Lampropoulou, M.; Yannakopoulou, K.

Versatile strategies for cyclodextrin bimodal systems with good aqueous solubility and efficient cell internalization for PDT

Protoporphyrin IX, 5Aminolevulinic Acid, Tandem System, Tamoxifen

Oral Presentation, No.: 6-C

Motoyama, K.; Onodera, R.; Tanaka, N.; Ohyama, A.; Okamatsu, A.; Higashi, T.; Kariya, R.; Okada, S.; Arima, H.

Potential use of folate-appended methyl-β-cyclodextrin as a novel anticancer agent

Regulation of Autophagy, Doxorubicin, Intravenous Administration

Oral Presentation, No.: 6-J

Estevez, C.; Isasi, J. R.; Velaz, I.

Release of β-galactosidase from poloxamine/α-cd hydrogels

Polyethylene oxide Block, Tetronic Matrices

Poster Presentation, No.: 6-03

Szeman, J.; Ludanyi, K.; Dalmadi-Kiss, B.; Klebovich, I.; Szente, L.

Quantitative determination of hydroxypropyl betadex in cerebrospinal fluid of children with Niemann-Pick Type C disease after intrathecal and intracerebral administration

Human Study, HPLC Method

Poster Presentation, No.: 6-04

Sanchez-Millares, S.; Sanchez, E. Sobarzo; Otero-Espinar, F.J.

Cyclodextrin-poloxamer 407 polimeric micelles for drug delivery

Econazole, Itraconazole, Cysteamine, Thioglycolic Acid, Hydrosolubilization

Poster Presentation, No.: 6-05

Dapena, A. F.; Saramago, C.; Aira, B. R.; Medez, J. B.; Alvarez, A. L.; Otero-Espinar, F.J.

Hydroxyapatite containing cyclodextrin microparticles for ciprofloxacin release

β-Cyclodextrin, RAMEB, (2-Hydroxy)propyl-β-cyclodextrin

Poster Presentation, No.: 6-06

Ferreiro, A. F.; Barciela, N. F.; Alvarez, A. L.; Mendez, J. B.; Barcia, M. G.; Otero-Espinar, F.J.

Cyclodextyrin-polysaccharide based *in situ* gelling system for ocular antifungal delivery

Bioadhesive Behavior, Cytotoxicity

Poster Presentation, No.: 6-07

Oliveri, V.; Attanasio, F.; Puglisi, A.; Spencer, J.; Vecchio, G.

Multifunctional 8-hydroxyquinoline-appended cyclodextrins as new inhibitors of metal-induced protein aggregation

Alzheimer's Disease, Parkinson Disease, NPC Disease, Metal Chelating Agent, Cu^{2+}, Zn^{2+}

Poster Presentation, No.: 6-08

Okano, C.; Nasuno, E.; Tsunematsu, Y.; Kawakami, R.; Iimura, K-I.; Morohoshi, T.; Ikeda, T.; Kato, N.

Cyclodextrin-immobilized microspheres for uptake of N-acylhomoserine lactone as the quorum sensing signal

CD-Immobilized Alginate, Inhibitory Effect

Poster Presentation, No.: 6-09

Dhordain, H.; Tabary, N.; Cazaux, F.; Degoutin, S.; Chai, F.; Hober D.,; Thevenin, T.; Neut, C.; Baillie, A.; Skopurinski, S.; Re, C.; Criquelion, J.; Blancheinain, N.; Martel, B.

Cyclodextrin finished facepiece respirator against pandemic threat

Air Filtration, Citric Acid, Cytocompatibility, Biocide

Poster Presentation, No.: 6-10

Kato, N.; Umemura, T.; Arai, M.; Okano, C.; Iimura K-I.; Eri, N.

Control of bacterial intercellular communication due to the interaction between cyclodextrins and signaling molecules

Opportunistic Human Pathogens, N-Acylhomoserine

Poster Presentation, No.: 6-12

Rajnavolgyi, E.; Laczik, R.; Kun, V.; Fenyvesi, E.

Effects of RAMEA-complexed polyunsaturated fatty acids on the response of human dentritic cells to inflammatory signals

Eicosapentaeinc Acid, α-Linoleic Acid, Docosahexaenic Acid, Cell Surfsace Marker, Pro and Antiinflammatory Cytokines

Poster Presentation, No.: 6-17

Simoes, S. M. N.; Figueiras, A. R.; Veiga, F.; Alvarez-Lorenzo, C.; Concheiro, A.

Supramolecular α-cyclodextrin/PEO-copolymers for osteomyelitis and bone regeneration

Depots for Controlled Release of Antimicrobial Drugs, Vancomycin, Osteogenic Agents, Simvastatin

Poster Presentation, No.: 6-18

Aubert-Viard, F.; Martin, A.; Chai, F.; Tabary, N.; Rahmouni, O.; Junthip, J.; Neut, C.; Martel B.; Blanchemain, N.

Multilayer coating of a nonwoven polyester textile for antibacterial wound dressing

Multilayer Systems, Chlorhexidine

Poster Presentation, No.: 6-19

Miao, Y.; Leteve, M.; Wattraint, O.; Sarazin, C.; Djedaini-Pilard, F.; Bonnet, V.

Amphiphilic β-cyclodextrins: potential nanovecteurs of atanazavir

Blood-Brain Barrier, Glycerolipidyl-Cyclodextrins

Poster Presentation, No.: 6-20

Yameogo, J. B. G.; Geze, A.; Choisnard, L.; Godin-Ribuot, D.; Levilly D.,; Charrat, C.; Putaux, J-L.; Semde, R.; Wouessidjewe, D.

Pharmacokinetic study of intravenously administered artemisinin loaded surface-decorated amphiphilic γ-cyclodextrin nanoparticles.

Co-nanoprecipitation of Bioesterified γ-Cyclodextrin, C10-Alkyl Chains, PEG Derivatives, DMPE-mPEG2000, Polysorbate 80, Antimalarial Activity

Poster Presentation, No.: 6-21

Puskas, I.; Czifra, T. C.; Fenyvesi, E.; Szente, L.

Self-assembly of cyclodextrin solubilized cholesterol in simulated human cerebrospinal fluid

Glucose Urea, Inorganic Salts, Aggregation Site

Poster Presentation, No.: 6-23

Vyas, Amber

Formulation and evaluation of topical gel containing nanolipid carriers loaded with cyclodextrin complexed anticancer drug for treatment of skin cancer

Polymerized Cyclodextrin, 5-FU, Complexation, Nanolipid Carriers

Poster Presentation, No.: 6-22

Ikeda, T.; Morohoshi, T.; Saito, Y.; Ito, S.; Kato, N.

Quorum quenching using modified cyclodextrins

N-Acylhomoserine, Alkylamino-Cyclodextrins

Poster Presentation, No.: 6-24

Shende, P.; Kulkarni, Y.; Gaud, R. S.; Deshmukh, K.; Cavalli, R.; Caldera, F.; Trotta, F.

Acute and repeated dose toxicity studies on different nanosponges

Female Rat, Maximal Tolerated Dose

Poster Presentation, No.: 6-25

Seo, J-H.; Kakinoki, S.; Yamaoka, T.; Yui, N.

Modulating adhesion behavior of cells by changing the number of threaded α-cyclodextrin on polyrotaxane-coated surface

Polymer Surface, Cytoskeletal Signaling Pathway

Poster Presentation, No.: 6-26

Conte, C.; Costabile, G.; Tirino, P.; D'Angelo, I.; Grassia, G.; lalenti, A.; Ungaro, F.; Quaglia, F.

Skin permeation of small pegylated nanoparticles aided by 2- hydroxypropyl-β-cyclodextrin

Zn^{2+}-Phthalocyanine, Diblock Copolymer of PEG/Poly(epsilon-caprolactone), Permeation Enhancer

Poster Presentation, No.: 6-27

Conte, C.; Fotticchia, I.; Tirino, P.; D'Angelo, I.; Giancola, C.; Gref, R.; Ungaro, F.; Quaglia, F.

PEGylated nanoparticles formulated with cyclodextrins: A novel role of cyclodextrins in nanotechnology field?

Poly(epsilon-caprolactone)-Polyethylene glycol, PCL-PEG

Poster Presentation, No.: 6-28

4. CDs in Cell Biology

Khuntawee, W.; Wong-ekkabut, J.; Hannongbua, S.; Wolschann, P.; Rungrotmongko, T.

How does β-cyclodextrin penetrate into biological membrane?

All-atom-MD simulation, Molecular Dynamics, H-Bond Interaction

Poster Presentation, No.: 2-15

Lopez, C. A.; Marrink, S. J.

Computational microscopy of cyclodextrin mediated cholesterol extraction from lipid model membranes

Free-Energy Calculation, Cyclodextrin Dimer

Poster Presentation, No.: 2-19

Roux, R.; Eskandani, Z.; Badi, N.; Bennevault-Celton, V.; Legrand, F.-X.; Huin, C.; Guegan, P.

Star polymers based on β-cyclodextrins correlation between architecture and ability to form nanopores

β-Cyclodextrin, Poly(ethylene oxide) Polymer,Lipid Bilayer

Poster Presentation, No.: 3-10

Legrand, F-X.; Bochot, A.; Lairez, D.; Fadda, G.; Pehau-Arnaudet, G.; Briand, E.; Landy, D.; Boulmedarat L.,; Merlet, D.; Fattal, E.; Lesieur, S.

Interaction of methyl-β-cyclodextrin with vesicles: about the destabilization mechanism and the role of cholesterol

Phospholipid Bilayer Solubilization

Poster Presentation, No.: 4-04

Sortino, S.

Photoresponsive cyclodextrin-based nanoconstructs with a multifunctional cargo

Optical Syringe, Imaging Guided Phototherapy, Nanoparticle, Gel

Oral Presentation, No.: 6-A

Mondjinou, Y. A.; Collins, C. J.; Kulkarni, A.; Hyun, S-H.; Thompson, D. H.

Development of 2-hydroxypropyl-β-cyclodextrin: Pluronic®-based polyrotaxanes as potential Niemann-Pick Type C therapeutics

Nonaqueous Conditions, Diethyl Ether, nHexane, Multivalent Magnetic Resonance Imaging Construct, Biodegradable Blood Pool Contrast Agent, Longcicrculating (2Hydroxy)propylbetacyclodextrin

Oral Presentation, No.: 6-E

Yui, N.

Significance of supramolecular frames of CD-based polyrotaxanes as biomaterials: extracellular and intracellular approaches

Endocytosis Pathway, Release of CDs, Intracellular Stimuli

Oral Presentation, No.: 6-F

Bauer,M.; Charitat, T.; Daillant, J.; Fajolles, C.; Kekicheff, P.; Marques, C.

From sliding anchored polymers to sliding tethered ligand interactions

Lipidbeased Nano Devices, Membrane Insertion

Oral Presentation, No.: 6-G

Tamura, A.; Yui, N.

Lysosomal cyclodextrin release from biocleavable polyrotaxanes directed toward ameliorating lysosomal storage disorders

Pluronic Chain, PEG-b-PPG-b-PEG, Intracellular Cleavage of Terminal Disulfide Linkage

Oral Presentation, No.: 6-H

Zhang, Y-H.; Chen, Y.; Liu, Y.

Cationic supramolecular nanoparticles for gene delivery

L-Cystine-bridged Bis(β-cyclodextrin)s, Adamantane Modified PEI, Transfection Efficiency

Poster Presentation, No.: 6-01

Wenz, G.; Albuzat, T.; Keif, M., Wichter, J.; Dandekar, P.; Jain, R.; Lehr, C-M.

Cellular delivery of polynucleotides by cationic cyclodextrin polyrotaxanes

Poly(bola amphiphile), Gene Transfection

Poster Presentation, No.: 6-02

Maeda, Y.; Motoyama, K.; Higashi, T.; Horikoshi, Y.; Takeo, T.; Nakagata, N.; Kurauchi, Y.; Katsuki, H.; Ishitsuka, Y.; Kondo, Y.; Irie, T.; Era, T.; Arima, H.

Effects of cyclodextrin derivatives on GM1 ganglioside in fibroblasts differentiated from IPS cells derived from GM1 gangliosidosis patients

GM1 Ganglioside, Methylated Cyclodextrins, (2-Hydroxy)propylated Cyclodextrins, Branched Cyclodextrins

Poster Presentation, No.: 6-11

Higashi, T.; Abu H., Irhan I.; Hayashida, K.; Tajima, A.; Kono, D.; Motoyama, K.; Arima, H.

Potential use of cyclodextrin polypseudorotaxanes as sustained release drug carriers for low molecular weight drugs, protein drugs and gene drugs

PEGylated Liposome, Doxorubicin, PEGylated Insulin, γ-Cyclodextrin, Luciferase Gene Expression, Transfection Efficiency

Poster Presentation, No.: 6-14

Hayashi, Y.; Higashi, T.; Motoyama, K.; Jono, H.; Ando, Y.; Arima, H.

Potential use of peg-appended lactosylated dendrimer/cyclodextrin conjugate as a hepatocyte-selective sirna carrier for the treatment of familial amyloidotic polyneuropathy

Transthyretin, Cellular Uptake

Poster Presentation, No.: 6-15

5. CDs in Food, Cosmetics and Agrochemicals

Kfoury, M.; Auezova, L.; Greige, H.; Fourmentin, S.

Effect of cyclodextrins on solubility, stability, controlled release and DPPH* scavenging activity of phenylpropanoids

Plant Secondary Metabolites, transAnethole, Estragole, Eugenol, isoEugenol, Caffeic Acid, pCoumaric Acid, Freulic Acid

Oral Presentation, No.: 2-B

Sangpheak, W. ; Khuntawee, W.; Wolschanrf, P.; Pongsawasdi, P.; Rungrotmongkol, T.

Theoretical and experimental studies of hesperetin and naringenin by complexation with β-cyclodextrin and its dimethyl derivative

Flavanones Found in Citrus Fruits

Poster Presentation, No.: 2-07

Uekaji, Y.; Onishi, M.; Nakata, D.; Terao, K.; Yoshii, H.

Formation of ubiquinoi by ubiquinone/γ-cyclodextrin inclusion complex with vitamin C

CoQ10, Lecithin,Micelle Formation FeSSIF, γ-CD Supplement

Poster Presentation, No.: 4-02

Reuscher, H.

New tasty foods by emulsification and whipping with α cyclodextrin

Thickering Agent, Soluble dietary Fiber, Egg Replacer

Oral Presentation, No.: 6-D

Furune, T.; Ikuta, N.; Ishida, Y.; Nakata, D.; Terao, K.; Sakamoto, N.

A study on inhibitory mechanism of lipid absorption by α-cyclodextrin administration

Lecitin, Bile Salts, Precipitation, α-cyclodextrin/Lecitin Complex

Poster Presentation, No.: 6-16

6. CDs for other Industrial Applications

Kubik, S.; Bierwisch, A.; Koller, M.; Leidner, A.; Reiter, G.; Schneider, C.; Worek, F.

Evaluation of cyclodextrin derivatives as scavengers for the detoxification of chemical warfare agents

Organophosphonate, Cyclosarin, Structure-Activity Relationship

Oral Presentation, No.: 1-G

Jouffroy, M.; Semeril, D.; Armspach, D.; Matt, D.

Confining phosphines derived from cyclodextrins for efficient regio- and enantioselective hydroformylation

Rhodium Monophosphine

Oral Presentation, No.: 1-H

Garg, V.; Gupta, U.

β-Cyclodextrin butanediol diglycidyl ether polymer as solid phase extraction adsorbent for dichlorovos

Organophosphorous Pesticide

Poster Presentation, No.: 2-33

Takashima, Y.; Harada, A.

Supramolecular polymerization catalyst by cyclodextrin derivatives in water

Cyclodextrin Dimers, Polymerases, Permathylated Cyclodextrins with Phosphine Ligand, Supramolecular Polymerization Catalysis

Oral Presentation, No.: 3-B

Khaoulani, S.; Cazier, F.; Bychkov, E.; Fourmentin, S.

Remediation of real wastewater by cyclodextrin polymers

Adsorption, Hexamethylene Diisocyanate, Toluene-2,6-diisocyanate, Carbonyl Diimidazole

Poster Presentation, No.: 3-04

Potier, J.; Menuel, S.; Woisel, P.; Hapiot, F.; Monflier, E.

Pickering emulsions from CD-based hydrogels and CD-substituted polymers: application to aqueous organometallic catalysis

Rhodium Catalyzed Hydroformylation, Higher Olefine

Oral Presentation, No.: 4-D

Feng, S.; Yang, Z.; Zhang, X.

Enhanced adsorption of pollutants onto nano-particles through the formation of host-guest supromolecule

Protocatechuic Acid Functionalized β-Cyclodextrin, Bisphenol A

Poster Presentation, No.: 4-06

John, D.; Krings, J. A.; Schillings, M. P.; Schmitz, D.; Pich, A.; Ravoo, B. J.; Bokera, A.

Assembly of cyclodextin-functionalized particles at interfaces

Pickering Emulsion, Photoresponsive Chains

Poster Presentation, No.: 4-09

Silva, N. R.; Yutronic, N. I.; Jara, P. S.

Crystals cyclodextrin inclusion compounds for growth of bimetallics nanoparticles

Cu/Au Nanoparticles

Poster Presentation, No.: 4-10

Kondo, Y.; Ulzii, M.; Tsurubuchi, K.; Yamada, M.; Hamada, F.

Cesium extraction capability for hybrid polymers consist of β-cyclodextrin and diatomite

Epichlorohydrin, Diatomite, Artificial Amorphous Silica

Poster Presentation, No.: 4-24

Do, T. T.; Nielsen, R. B.; Holm, R.; Larsen, K. L.

Absorption of volatile organic compounds by channel type cyclodextrin crystals

BTEX, Hexane, Limonene, Channel Type CD Crystal

Poster Presentation, No.: 4-25

Hamada, F.; Takagi, S.; Terui, A.; Rondo, Y.

Gas adsorption profile based on hybrid polymers consist of modified cyclodextrins and amorphous silica

Ethylenediamine Modified β-CD, Butyl β-CD Polymer, Hydrogen Adsorption

Poster Presentation, No.: 4-29

Stade, L. W.; Duroux, L.; Nielsen, T. T.; Gurevich, L.; Larsen, K. L.

Grafting of β-cyclodextrin dextran polymers to SiO_2 surfaces: surface characterization

6-Monoamino-6-monodeoxy-β-CD, 1-Adamantanecarboxylic Acid, Antifouling Properties

Poster Presentation, No.: 4-30

7. CDs in Sensing and Analysis

Benkovics, G.; Malanga, M.; Jindrich, J.

Supramolecular aggregates based on cinnamyl and hydrocinnamyl modified α- and β-cyclodextrins

Capillary Separation Techniques, Regioisomers of Monocinnamyl-α- and -β-CDs

Poster Presentation, No.: 1-11

Benkovics, G.; Rezanka, M.; Bednarova, E.; Blahova, M.; Jindrich, J.

Synthesis and properties of regioisomers of monosubstituted cyclodextrin derivatives

Allyl-, Cinnamyl- or Propargyl Bromide, Peracetates, Capillary Electrophoresis

Poster Presentation, No.: 1-15

Sohajda, T.; Szente, L.

Exploration of association forming affinity of cyclodextrins with capillary electrophoresis: pros and cons in a comparative view

Cyclodextrin Driven Interactions, Comparative Evaluation

Oral Presentation, No.: 2-F

Koeda, T.; Wada, Y.; Neoh, T-L.; Furuta, T.; Yoshii, H.

Encapsulation of retinyl palmitate with a mixture of cyclodextrins and maltodextrins by the kneading method

Substituted Maltooligosaccharide, Capillary Electrophoresis

Poster Presentation, No.: 2-02

Nonaka, K.; Yasui, M.; Yamaguchi, M.; Hashimoto, T.; Hayashita, T.

Development of ditopic type probe/cyclodextrin complex sensors possessing ion response function

Versatile Chiral Switching and Sensing Devices, Sensing Guest Anions in Water

Poster Presentation, No.: 2-08

Fejos, I.; Kazsoki, A.; Sohajda, T.; Szente, L.; Beni, S.

Stereospecific interactions between the four isomers of sexual potency enhancer tadalafil and various cyclodextrins

Cyclodextrin Modified Capillary Electrophoresis, Sulfobutylated α-Cyclodextrin

Poster Presentation, No.: 2-28

Fejos, I.; Znaleziona, J.; Kazsoki, A.; Sohajda, T.; Szente, L.; Maier, V.; Beni, S.

Enantioseparation of tapentadoi stereoisomers by cyclodextrin- modified capillary electrophoresis

Non-charged (2-hydroxy)propyl Cyclodextrins, Negatively Charged Hosts, Sulfated α-Cyclodextrin

Poster Presentation, No.: 2-34

Yan, J.; Mao, Q.; Wang, Y.; Li, W.; Zhang, A.

Oligoethylene glycol-modified thermoresponsive cyclodextrins

Phase Transition Temperature, Fluorescent Sensor

Poster Presentation, No.: 5-03

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