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Application of one and two dimensional NMR techniques in drug delivery experiments

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Nano encapsulation drug immobilization of water insoluble active pharmaceutical ingredients is challenging tasks in designing new drugs nowadays. Different nanoformulation techniques may help to increase drug bioavailability as well as efficiency and reducing the possibility of side effects, or producing formulas that can be used as targeted therapeutic agents. Overcoming the solubility limitations of these compounds is part of these tasks. Using different polymer compounds, dendritic macromolecules can be one of the solutions to prepare colloidal dispersion of the drug molecules with higher bioavailability as it is dissolved in the media through solubilisation. On the other hand these molecules with a recognition site can also be used as targeted drug delivery systems. NMR diffusiometry or two dimensional NOESY techniques are often applied to study the structure of the forming nanoparticles in aqueous media. Reversible immobilization of the compound inside porous or lamellar materials or on the surface of nanoparticles (gels, graphene sheets, titania or silica nanoparticles) might have an important role in controlled drug release. Getting information on the pore/lamellar structure (shape, size and surface chemistry) is essential prior using these nanomaterials as a matrix. In these cases NMR diffusiometry and relaxometry can be used to achieve our goals. In this study we are going to present our NMR findings on the previously mentioned fields using high and low resolution NMR techniques to prove their everyday applicability on these fields.

Biography

Koppany Kovacs has started his Chemical Engineering BSc study at the University of Debrecen in 2015. He joined to the Colloid Chemistry group at the Department of Physical Chemistry Department as a first year student, and started to work with Zoltan Nagy on the field of NMR applications in colloid chemistry using NMR diffusiometry and relaxometry combined with mathematical approaches and has studied the applicability of these measurements using mono and multicomponent systems in order to get structural, dynamical and size distribution information on the nanoparticles.

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