Poster Presentation

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Structural behavior of organic zeolites on guest sorption/desorption

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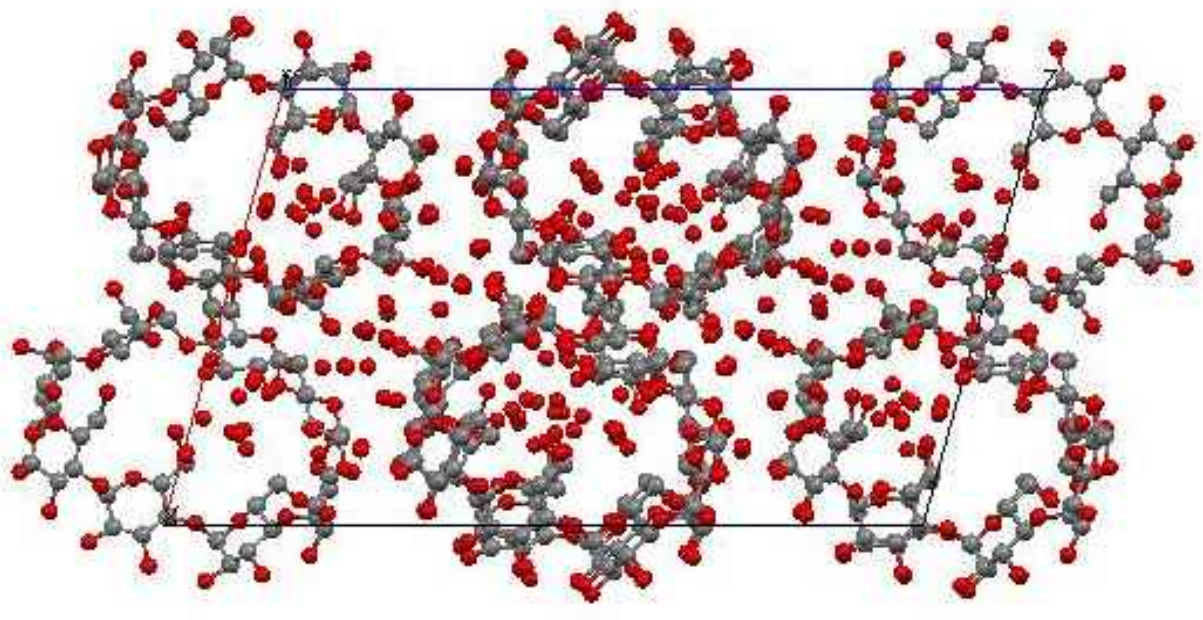
The term organic zeolites, originally has been introduced to chemical literature by R.M. Barrer, to describe molecular crystals having open porous structures, able to reversibly absorb and desorb organic species with relatively weak, if any, sorption of water or other hydrophilic molecules. A characteristic feature of the organic zeolite structures, when compared to classical 'inorganic' zeolites based on aluminosilicates, is the relatively weak intermolecular bonding within the host component. This is the reason for significant flexibility of the host crystal structure which changes its parameters upon guest absorption, desorption or exchange. The most characteristic property in this respect is absorption with 'adsorbate generated sorption sites' which is the basis for design and control of selectivity and efficiency of sorption-desorption processes. In general, organic zeolite behavior may be observed on a large variety of supramolecular materials, including solvates of macrocyclic compounds and in the very important, so-called- MOFs. In the paper solvation of cyclodextrins and their complexes will be used as the convenient example, based on brand new, mostly yet unpublished large structures of heavily solvated cyclodextrin complexes in the solid state. Cyclodextrins are commonly known as materials having intra-molecular cavity able to accommodate guest species. This property, when combined with sorption in the inter-molecular space in the solid state structures of CDs leads to very interesting structures and properties. In general, such behavior may be observed only when CD moieties are at equilibrium with a solution of the respective guest and solvent species. The equilibria are quite sensitive to minor changes of solution chemical composition what may be observed microscopically as morphology changes of the crystalline phases. This phenomenon will be illustrated with short movies demonstrating crystal behavior on change of its environment. Novel x-ray structures will also be demonstrated and commented. This work was supported by grant POIG.01.01.02-14-102/09.



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