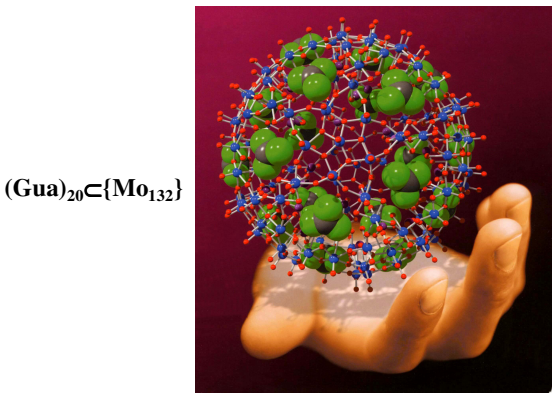
Porous capsules interact specifically with their environment and with one another

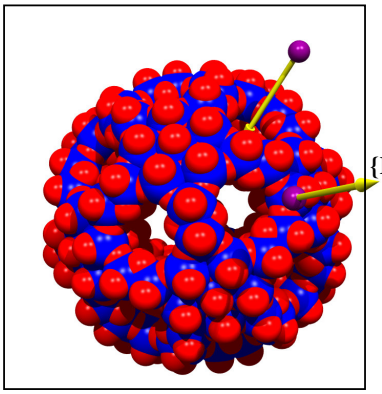
Achim Müller, Bielefeld

Structurally well-defined mostly anionic porous spherical molybdenum-oxide based nanocapsules/artificial cells of the type $\{Pentagon\}_{12}\{Linker\}_{30}^{n-}$ allow unprecedented chemistry including sphere-surface chemistry and to follow new routes to *different disciplines* including *Materials Science*, *Physics* and even *Discrete Mathematics*. The size of the capsules and their 20 pores can be varied; as the pores have crown ether function they can be opened and closed with corks/guests, like guanidinium cations (Fig. top left). The internal cavity's shell can get differently functionalized due to the presence of different ligands which influence the structure of the encapsulates, including that of the uptaken (small) cation/water assemblies. Fascinating aspects are that the capsules interact specifically with their environment (with the option to model transmembrane cation transport; Fig. top right) and that some show a new type of assembly process. The same is valid for wheel-shaped Mo_{154} type species which show self-association based on glue type interfacial/confined highly structured water templated by the cluster surface (Fig. botttom).



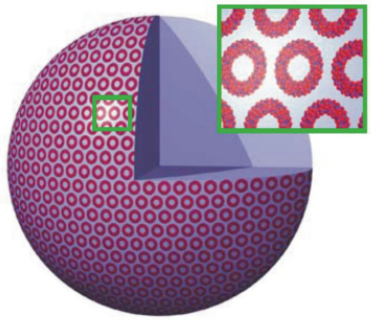
$(Gua)_{20}\subset\{Mo_{132}\}$

"Bild der Wissenschaft"
(cover)



$\{Mo_{132}\}$

ca. 3.0 nm



$\{Mo_{154}\}_{\approx 1165}$

ca. 90 nm

Literature (own reviews/papers and highlights of others)

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