Poster Presentation

MS083.P02

Nanomotors: autonomous motion induced chemically in active soft-oxometalates (SOMs)

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Synthesis of autonomously moving soft and active matter [1] is an immediate challenge for modelling biological phenomenon as well as in current nanoscience and nanotechnology. In nature various biological motors are present. For instance, eukaryotic cells contain several powerful biomotors which convert chemical energy from hydrolysis of ATP to mechanical work. Taking inspiration from these biological machines various groups across the world have started working with synthetic micromotors [1]. In recent times, although, moving matter has been designed, their synthesis is tedious and many of their motions are relatively slow. Here we will demostrate a system based on heptamolybdate soft-oxometalates (SOMs) [2], self-assembly of polyoxometalates- which is very easy to synthesize and is used as a model system in our study. This system moves autonomously in response to chemical stimuli like that of a reducing agent-dithionite [3]. The redox active MoVI sites of SOMs are used for oxidizing dithionite to generate SO2 to propel the micromotors. We explain this motion qualitatively and also show how surface interaction, adsorption isotherm of the evolved gas influence power conversion efficiency of these micromotors. This explains that using a simple redox system and exploiting this potential in SOMs it is possible to construct SOM micromotors and in principle possibilities exist for fine tuning their motion.

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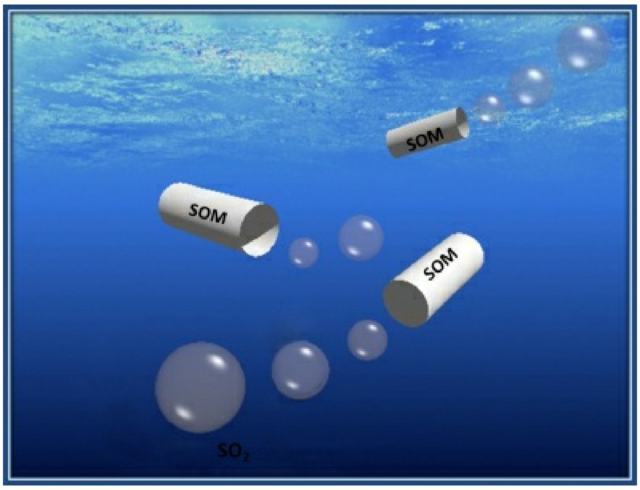

Keywords: Soft-oxometalates (SOMs), Nanomotors, Active matter