Colloidal synthesis approach for energy materials

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Colloidal route is one of the favored ways toward cost-effective large scale production of various nanostructures [1]. In our study, different types of nanoparticles have been designed and synthesized via colloidal approach, which can be applied for energy storage and other energy-type applications. For example, dispersible mesoporous nitrogen-doped hollow carbon nanoplates have been made by using gibbsite nanoplates as templates [2]. The resulted hollow carbon nanoplates bear uniform hexagonal morphology with specific surface area of 460 $m^2 \cdot g^{-1}$ and fairly accessible small mesopores (~ 3.8 nm). The obtained 2D hollow carbon nanoplates can be successfully applied as electrode materials for symmetric supercapacitors.

Recently, we have successfully synthesized multifunctional Ti_4O_7 particles with interconnected-pores structure by using porous PS-P2VP particles as soft template [3]. Moreover, in order to improve the conductivity of the electrode, a thin layer of carbon has been coated on the Ti_4O_7 surface without destroying its porous structure. The porous Ti_4O_7 particles as well as carbon-coated Ti_4O_7 particles show significantly improved electrochemical performances as cathode material for Li-S batteries as compared with that of TiO_2 particles.

References:

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