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Sacrificial template-assisted hydrothermal green synthesis of hollow micro- and nano inorganic materials

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Recently, the research activity for the fabrication of inorganic oxides hollow micro and nanoparticles has increased largely due to their unique and enhanced properties, such as low density, hollow cores and large specific surface area combined with the various functions of oxides. They have shown to be promising as inorganic containers and vehicles in various applications, such as catalysis, water treatment, photonic devices, chemical sensors, prosthetic materials and controlled release applications. To date, inorganic hollow particles have been fabricated by using various novel mechanisms. Among many synthesis mechanisms, sacrificial templating methods are considered as the most often used strategies. They rely on the formation of core-shell composites and subsequent removal of the core by chemical or thermal means. However, the use of sacrificial templates has several intrinsic disadvantages related to the high cost and the high level of impurities which are related to the tedious multistep synthesis protocols. Therefore, these pitfalls gave prompt interest in developing facile, environmental benign, economically sustainable and additives free synthesis approaches to prepare the inorganic hollow micro- and nanoparticles with controlled void size and regular morphology. This lecture gives overview on the fabrication of hollow inorganic micro- and nanoparticles utilizing simple sugar as sacrificial templates by the green hydrothermal approach. Furthermore, the advances in the present research results using this green-chemical approach will be presented.

Biography

Haitham Mohammad Abdelaal received his PhD degree in February 2013 from Marburg University, Germany, under the direction of Prof. Bernd Harbrecht with a focus on materials chemistry. In April 2013, he joined the Ceramics Laboratory, The National Research Center, Egypt, as a Research Scientist to work on the design of nanomaterials for the water treatment applications. He is the recipient of the highly prestigious DAAD fellowship from German Academic exchange service (2009-2011).

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