Soft X-ray Absorption Spectroscopy Study of Carbon- based Nanostructures for Environmental Applications.

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Abstract

Carbon- based nanomaterials family is one of the most important materials involved in the science and technology development during the last two decades. Carbon- based nanoscale materials, e.g., carbon nanotubes, graphene, and graphene quantum dots, have emerged as the most interesting nanomaterials in nanoscience and nanotechnology for their myriad promising applications such as for electronics, sensors, biotechnology, etc. Understanding of the nature of surface and electronic structures of such nanostructures plays a key role in the development and improvement of their application. Synchrotron soft X-ray absorption spectroscopy (XAS) shows unique capability in revealing the surface and electronic structures of C based nanomaterials. XAS is demonstrated as a powerful technique for probing chemical bonding, the electronic structure, and the surface chemistry of carbon-based nanomaterials, which can greatly enhance the fundamental understanding and applicability of these nanomaterials in different applications.

In this proposal we aim to study a serios of carbon-based nano (Singl wall CNTs, GO, rGO and GQDs) materials by Soft- X-ray spectroscopy as a complementary technique, in an attempt to understand their electronic environment and to estimate how much their electronic structures can effect on their mechanisms as anti-microbial agents.