Synthesis and characterization of novel crystalline silica nanoplates prepared from amorphous silica nanoparticles via hydrothermal methods

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Crystalline silica is one of the mineral components found in the earth's crust. It has been used to make products engineering materials and used for applications such as potential electrode materials in the rechargeable battery and optoelectronic and sensing devices. One of the occurring phases of crystalline silica is □-quartz. Their typical structure shows a shape of spherical nanoparticles exhibiting the crystal habit of □-quartz. However, synthesizing novel crystalline silica possessing two-dimensional layered nanostructure has not yet been established. We report synthetic methods of preparing novel crystalline silica nanoplates from amorphous silica nanoparticles. As-prepared crystalline silica nanoplates have been characterized employing powder X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), and atomic force microscopy (AFM). Results of the structures and properties of crystalline silica nanoplates and the mechanisms of their formation will be discussed in the presentation.