

**NANOPOROSITY IN SINTERED SILICA POWDERS FROM
RICE HULL ASH**

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Sintering of different types of vitreous silica powders have been studied by several authors, but most of these studies focused on sol-gel derived powders. However, sol-gel techniques are generally expensive and not that easy to control. In this work we investigate the possibility to convert an inexpensive source of silica, rice hull, into a product of technological importance, silica glass. After adequate processing, rice hull ash powders may have high specific areas ($>150\text{m}^2/\text{g}$) and reasonable purity. The silica powder obtained from our processing of rice hull ash exhibits a large particle size distribution, with an average size of about 7 microns. These micron-sized particles are agglomerates of quasi-monodispersed 70nm spherical particles. Sintering of these powders is a nested process; intra-agglomerate sintering occurs first, changing the agglomerate sizes, that sinter slowly. We present the first experimental results of these two sintering steps and use a simple model to account for the simultaneous sintering and crystallization. We emphasize the development of an intricate pattern of both inter and intra-agglomerate porosity.

Keywords: vitreous silica, sintering, porosity, rice hull ash.