

Abstract Submitted  
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**Medium-range Order in Periodic Mesoporous Silica**<sup>1</sup> ELLA WAN, Ohio University, KUANGMIN LI, GANG CHEN, Ohio University — Periodic mesoporous materials contain ordered pores with diameters between 2 and 50 nm. In spite of their ordered pore structure, most periodic mesoporous materials do not possess crystalline pore walls, and the atomistic origin of the uncrystallizable pore walls has been elusive. It is believed that the medium-range structure in such materials holds the key to the answer. To understand the medium-range order in periodic mesoporous materials, we select periodic mesoporous silica as a model system for this study. SBA-15 of various pore sizes (5-15 nm) have been synthesized through a self-assembly process using triblock copolymers as the structure-directing agents. X-ray scattering was used to characterize the materials. Pore widths and pore thicknesses of SBA-15 were measured by small-angle x-ray scattering, and the medium-range structure was characterized by wide-angle x-ray scattering. Effects of periodic pore structure and temperature on the medium-range order of amorphous pore walls have been identified. Our study provides atomic insights into the origin of uncrystallizable pore walls of periodic mesoporous materials in general.

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