Pore Size Tunning of Mesoporous Silica Thin Films using Swelling Agent

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Large-pore mesoporous silica thin films were synthesized by incorporating poly (propylene oxide) as a swelling agent with Pluronic F127 block copolymer. The influence of the various synthesis parameters, such as the addition of poly (propylene oxide), the condensation catalyst (HCl, NH3), and the aging time, was systematically explored, especially their influence on the mesostructure, thickness and refractive index. The silica synthesized under typical conditions is a well-ordered cubic Im3m structure with a good quality of cage-like pore structure. The refractive index of 1.21 and total porosity of 59 %(vol) were obtained from cubic thin films.