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Self-supporting silica aerogel thin films with high flexibility

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ABSTRACT: *Self-supporting mesoporous silica thin films are generally fabricated by the first high-temperature thermal degradation of the pore-forming templates and the subsequent dissolution of the substrates.* Herein, the poly- α -methyl styrene (PAMS) layers were treated as the sacrificial substrates for the preparation of nanoporous silica aerogel thin films, and the sacrificial substrates were eliminated by a low-temperature thermal degradation. In this work, the obtained self-supporting silica aerogel thin film had a large size of about 8 mm \times 8 mm, and exhibited high flexibility. In addition, effect of the viscosity on the properties and microstructures of the films was also examined.

Key words: aerogel thin film, self-supporting, sol-gel process, thermal degradation

1. Introduction

Self-supporting nano-porous thin films have attracted considerable attentions because of their prospective applications in adsorption, separation, catalysis, sensors, energy conversion, and so on [1-3]. Several strategies have emerged in the past two decades for the self-supporting mesoporous silica films, which represent an important breakthrough in nanochemistry and offer a new tool for several applications of

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