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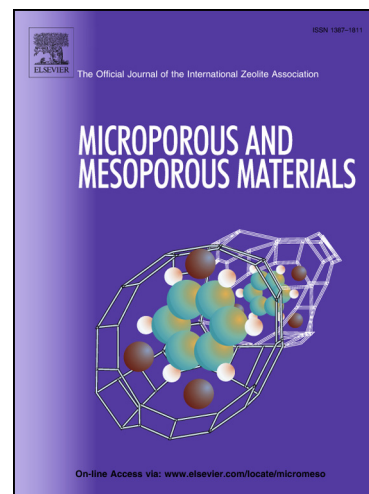
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**Effect of silica sources on nanostructures of resorcinol-formaldehyde/silica and carbon/silicon carbide
composite aerogels**

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Abstract

The subject of this paper is the investigation of the effect of silica sources on microstructure of resorcinol-formaldehyde/silica composite (RF/SiO₂) and carbon/silicon carbide composite (C/SiC) aerogels. Hybrid silica sources (HSS) were composed of 3-(aminopropyl)triethoxysilane (APTES) and tetraethoxysilane (TEOS) with different molar ratio. RF/SiO₂ aerogel was obtained by a single-step sol-gel process followed by supercritical fluid drying (SCFD). C/SiC aerogel was formed from RF/SiO₂ aerogel after carbothermal reduction. Scanning electron microscopy (SEM) and N₂ adsorption/desorption were used to investigate the evolution of morphology and pore structures of aerogels. X-ray diffraction (XRD) and transmission electron microscopy (TEM) demonstrated that the as-prepared C/SiC aerogel was composed of carbon nanoparticle and α -SiC nanocrystal. The microstructure was hugely affected by the component of HSS. When the molar fraction of APTES in HSS was 60%, RF/SiO₂ and C/SiC aerogels possessed the highest surface area and pore volume and the lowest thermal conductivity.

Keywords: aerogel; pore structure; microstructure; supercritical fluid drying; thermal insulation

1. Introduction

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