Research on silicon-based non-oxide high temperature ceramic aerogels

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Abstract: The excellent adsorption properties of SiO_2 aerogels stem from its interpenetrating pore structure and tailorable chemical composition and surface chemical structure. Gas or liquid can be selectively diffused and circulated to the whole material through the interconnected pores. This characteristic makes SiO_2 aerogel has become an ideal new adsorbent and has good application prospects in the fields of water treatment, gas separation and drug loading. However, due to its structural characteristics, SiO_2 aerogel has poor structural stability at high temperatures. In recent years, researchers have conducted a series of research and development on silicon-based non-oxide ceramic aerogels. In view of the excellent temperature resistance and mechanical properties of SiC and Si_3N_4, they can be combined with the structural characteristics of SiO_2. Developed a silicon-based non-oxide ceramic high temperature resistant aerogel, which in turn enables the aerogel to maintain its structural stability at temperatures above 1600°C.

Keyword: aerogel; SiC; Si_3N_4; High temperature resistance; ceramics.

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