

化学

ICF用铜基低密度气凝胶靶材料研制

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摘要 过渡金属基气凝胶是惯性约束聚变实验中靶的候选材料。以无机铜盐CuCl₂的醇溶液为前驱体, 采用聚丙烯酸为分散剂, 环氧丙烷为凝胶促进剂, 通过溶胶-凝胶工艺制备了柱状铜基醇凝胶。铜基醇凝胶经CO₂超临界流体干燥后即可得到浅绿色柱状铜基气凝胶靶材料, 材料密度为120~150 mg/cm³。由扫描电子显微镜对气凝胶的微结构分析可知, 该样品呈现由纳米级球形颗粒均匀堆积而成的网络结构。红外光谱、X射线衍射图谱和X射线荧光光谱的结果表明, 样品结晶部分的成分主要为斜方晶Cu²⁺₂Cl(OH)₃, 而无定形部分的成分为水合氢氧化铜。

关键词 [铜基](#) [气凝胶](#) [环氧丙烷](#) [聚丙烯酸](#)

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Preparation Method of Monolithic Copper Oxide Aerogels

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Abstract The transition metal based aerogels are available for target materials of ICF. The monolithic copper oxide aerogels were prepared from copper chloride, propylene oxide and polyacrylic acid. Firstly, by using of cupric chloride solution as precursor, polyacrylic acid as dispersant and propylene oxide as accelerator, and selecting suitable mould, the columnar copper-based aerogel was made under the sol-gel process. And the proper ratio of reactants was got via the experiment. Then the columnar light-green monolithic aerogel sample was obtained by the process of aging and supercritical drying. SEM studies indicate that the sample has a network porous structure composed of uniform nano-scale spherical particles. In term of IR, XRD and XRF, it indicates that the crystal part of the aerogel is mostly orthorhombic copper chloride hydroxide and the amorphous part is aquo cupric hydroxide.

Key words [copper-based](#) [aerogel](#) [propylnen oxide](#) [polyacrylic acid](#)

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