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树脂基球状活性炭的制备及对二氧化碳吸附性能的研究

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Preparation of resin-base spherical activated carbon and study on adsorption properties towards CO_2

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摘要 以四种离子交换树脂（两种强碱性树脂D201和D280、两种弱碱性树脂D301G和D301R）为原料，经过磺化、炭化、活化处理制备了树脂基球状活性炭。采用TG、SEM、N_2吸附等对球状活性炭的收率、表面形貌、比表面积进行了表征，研究了所制球状活性炭对CO_2的吸附性能。结果表明，磺化处理有助提高树脂球的炭化收率；得到的四种球状活性炭对CO_2吸附性能良好，强碱性树脂球原料比弱碱性树脂球更具有优势，其中，由强碱性树脂球D201制得的树脂球状活性炭在30 ℃下对CO_2的吸附量可达2.57 mmol/g；十次循环吸附之后，树脂球仍能保持很好的CO_2吸附性能。

关键词： 球状活性炭　离子交换树脂　磺化　CO_2吸附

Abstract: Resin-based spherical activated carbons were prepared from four kinds of ion exchange resin(two strong basic resins D201 and D280, two weak basic resins D301G and D301R)through sulfonation, carbonization and activation treatment. The yield of the spherical activated carbons, the surface morphology and the specific surface area were characterized by thermogravimetric analysis, scanning electron microscopy and nitrogen adsorption. The adsorptive capacities of the spherical activated carbons towards CO_2 were investigated. The results showed that the yield of carbonized spheres was improved after sulfonation. The four prepared spherical activated carbon samples exhibited good adsorption performance to CO_2. The strong basic resin-based spherical activated carbons provided a higher CO_2 adsorption capacity than the weak basic resin-based spherical activated carbons. The CO_2 adsorption capacity of the spherical activated carbons obtained from strong basic resin D201 reached 2.57 mmol/g, and remained high after ten cycles.

Key words: spherical activated carbon　ion exchange resin　sulfonation　CO_2 adsorption

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