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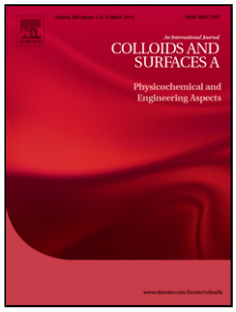

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Activated polypyrrole-derived carbon spheres for superior CO_2 uptake at ambient conditions

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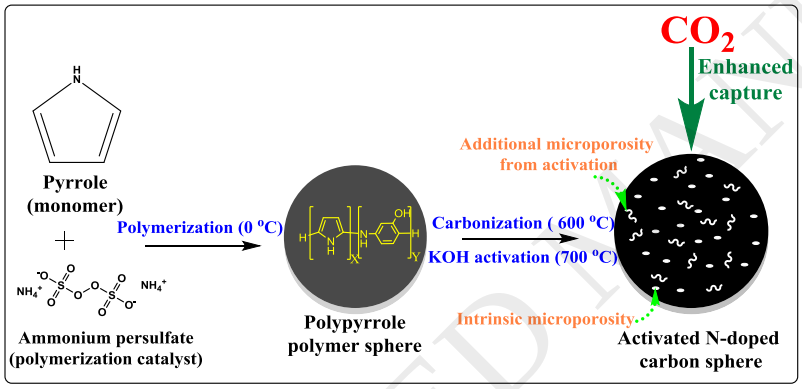
Graphical Abstract



Abstract

High inherent microporosity of the polypyrrole-derived carbon spheres was further optimized by controlled KOH activation with the intention to achieve high CO_2 adsorption capacity. After activation the spherical morphology and nitrogen doping were retained and the volume of micropores, especially ultramicropores, was noticeably enhanced. High ultramicropore volumes of these spheres resulted in the superior CO_2 uptakes under ambient pressure, reaching 7.73 mmol g^{-1} and 5.42 mmol g^{-1} at 0 ˚C and 25 ˚C, respectively. This study shows an effective way for designing of carbon spheres with high CO_2 adsorption capacity and selectivity.