

UiO-66/PVA 복합 그래놀의 합성 및 톨루엔 흡착 특성

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Zirconium-based metal organic framework like UiO-66(Zr) is one of popular materials applied in adsorption field. However, it has still had limitations in fixed-bed adsorption system owing to its tiny sub-micron crystallite size. Thus, an approach to construct mm-scale granules using UiO-66(Zr) powder is required. In this study, UiO-66(Zr) particles, prepared by solvothermal method under microwave irradiation for only 20 min, were fabricated into spherical granules of UiO-66/PVA by freeze granulation technique. Here, PVA was added as a binder. The effect of PVA concentration on mechanical strength and physical properties of composite granules was studied systematically. The results exhibited that with increasing PVA concentration, mechanical stability was enhanced whereas the porosity was decreased. The UiO-66/PVA granules were utilized for toluene adsorption by breakthrough experiments. The results indicated that UiO-66/PVA granules have potential application for capturing toluene at ambient pressure under industrial scale.