Synthesis of Cu-doped MOF-235 crystals and their application to the degradation of methylene blue under visible light irradiation

Tran Nguyen Tien, 김진수[1,†]
경희대학교; [1]Kyung hee university
(jkim21@khu.ac.kr[†])

Cu-doped MOF-235 with controllable morphology and size were prepared by solvothermal method. X-ray diffraction (XRD), energy dispersive spectrometry (EDS), field emission scanning electron microscopy (FESEM), energy-dispersive analysis of X-rays (EDX), thermogravimetric analysis (TGA), X-ray photoelectron spectroscopy (XPS), and UV–vis spectroscopy were used for characterization of the as-prepared products. The XPS results revealed that Cu^{+} and Cu^{2+} species coexisted in Cu-doped MOF-235. Additionally, the surface area of the Cu-doped MOF-235 was smaller than that of the MOF-235 because some of the pores of the MOF-235 were blocked by the deposited Cu metal. Afterwards, the photocatalytic performances of the resulting Cu-doped MOF-235 particles were evaluated by the photocatalytic degradation of methylene blue (MB) in aqueous solution under visible light irradiation. The results indicate that photocatalytic degradation of MB is higher for Cu-doped MOF235 than for pure MOF-235 or commercial TiO_2 photocatalysts. The Cu-doped MOF-235 (40 at%) exhibited the highest photocatalytic activity for the MB dye.