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Bi(iii) immobilization inside MIL-101: enhanced photocatalytic performance

Kovalenko K., Ruban N., Adonin S., Korneev D., Erenburg S., Trubina S., Kvashnina K., Sokolov M., Fedin V.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

 A novel hybrid material Bi(iii)@MIL-101 (Bi(iii) = Bi-containing oxoclusters and MIL-101 = chromium(iii) oxoterephthalate) was obtained by the intra-pore hydrolysis of guest bismuth(iii) chloride in ammonia solution. This compound was characterized by chemical analysis, powder X-ray diffraction, nitrogen sorption and TEM techniques. According to the obtained data all Bi species are located only inside the matrix. The framework structure remains intact during all synthetic operations. The chemical nature of Bi(iii)-containing clusters inside the MIL-101 matrix was suggested based on the EXAFS study. The catalytic activity of Bi(iii)@MIL-101 in photodegradation of methyl red (MR) has been tested. The introduction of Bi(iii)-species inside MIL-101 significantly increases the photocatalytic performance in comparison with layered BiOCl which was obtained under the same synthetic conditions without MIL-101.

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