Journal of Alloys and Compounds, vol. 724: 450-455

Synthesis of rGO/Zr-MOF composite for hydrogen storage application

Musyoka, Nicholas M
Ren, Jianwei
Langmi, Henrietta W
North, Brian C
Mathe, Mkhulu
Bessarabov D

ABSTRACT:

A composite material consisting of Zr-based metal organic framework (Zr-MOF) and reduced graphene oxide (rGO) was successfully synthesized by an in situ method. The aim of the study was to transfer some of the graphene's attractive properties to the MOF materials. An important observation was that the incorporation of rGO did not alter or interfere with the crystallization of the MOF material. The studies showed an increase in surface area for the rGO/Zr-MOF composite (1480 m^2/g) when compared to that of pristine Zr-MOF (1116 m^2/g). There was also an enhancement of the hydrogen storage capacity from 1.4 wt% to 1.8 wt% for the GO/Zr-MOF composite. This enhancement could be attributed to the synergistic contribution of interactions of rGO sheets with hydrogen as well as from the possible expansion of the pore space in the Zr-MOF induced by the presence of the graphene-like material.