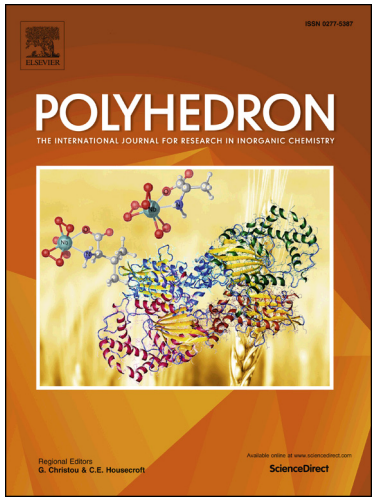

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Title

Wrapping Flexible Metal-Organic Framework with Organic Polymers via Site-Specific Radical Polymerization from Its Crystal Surface

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Abstract

In this study, we succeeded in the crystal surface modification of metal-organic framework (MOF) with an organic polymer by site-specific radical polymerization. A MOF was selected with interpenetrated structure containing a naphthalenediimide moiety with electron accepting capability. *N*, *N*-dimethylaniline, as an electron donating guest, induced electron transfer to the napthalenediimide moiety, generating radical anions on the pore and crystal surfaces, initiating radical polymerization. The resulting composite was examined in detail with XRD, TG, TEM, ICP, IR, gas adsorption, and fluorescent measurements, demonstrating that an organic polymer was generated only on the crystal surface, preserving the original porous property. In addition, higher structural stability in response to H_2O was observed after polymer wrapping.

Keywords: Metal-organic framework, Crystal surface, Radical polymerization, Organic polymer, Flexible structure

1. Introduction

Extended modular porous frameworks are important in applications including storage, separation, sensors, and heterogeneous catalysis [1,2]. Together with the further development of conventional open-framework inorganic materials, recent progress in the field of metal-organic frameworks (MOFs) has opened new possibilities for gas storage