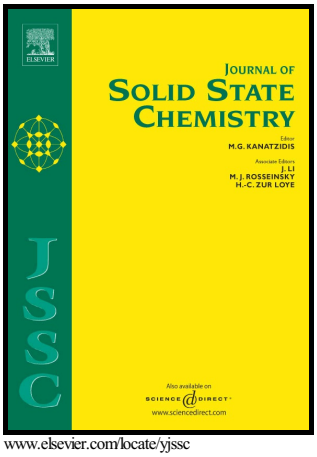
# Utilization of Pebax 1657 as structure directing agent in fabrication of ultra-porous ZIF-8

A. Jomekian, R.M. Behbahani, T. Mohammadi, A. Kargari




www.elsevier.com/locate/yjssc

PII: S0022-4596(16)30004-4
DOI: http://dx.doi.org/10.1016/j.jssc.2016.01.004
Reference: YJSSC19226

To appear in: *Journal of Solid State Chemistry*

Received date: 7 October 2015
Revised date: 2 January 2016
Accepted date: 4 January 2016

Cite this article as: A. Jomekian, R.M. Behbahani, T. Mohammadi and A. Kargari, Utilization of Pebax 1657 as structure directing agent in fabrication o ultra-porous ZIF-8, *Journal of Solid State Chemistry* http://dx.doi.org/10.1016/j.jssc.2016.01.004

# Utilization of Pebax 1657 as structure directing agent in fabrication of ultra-porous ZIF-8

A. Jomekian[a,b], R.M. Behbahani[a*], T. Mohammadi[b], A. Kargari[c]

[a] Gas Engineering Department, Ahvaz Faculty of Petroleum Engineering, Petroleum University of Technology (PUT), Post Office Box 63431, Ahvaz, Iran

[b] Faculty of Chemical Engineering, Iran University of Science and Technology (IUST), Narmak, Tehran, Iran

[c] Department of Petrochemical Engineering, Amirkabir University of Technology (AUT), Mahshahr, Iran

ABSTRACT:

Ultra porous ZIF-8 particles synthesized using PEO/PA6 based poly(ether-block-amide) (Pebax 1657) as structure directing agent. Structural properties of ZIF-8 samples prepared under different synthesis parameters were investigated by laser particle size analysis, XRD, $N_2$ adsorption analysis, BJH and BET tests. The overall results showed that: 1- The mean pore size of all ZIF-8 samples increased remarkably (from 0.34 nm to 1.1-2.5 nm) compared to conventionally synthesized ZIF-8 samples. 2- Exceptional BET surface area of 1869 $m^2/g$ was obtained for a ZIF-8 sample with mean pore size of 2.5 nm. 3- Applying high concentrations of Pebax 1657 to the synthesis solution lead to higher surface area, larger pore size and smaller particle size for ZIF-8 samples. 4- Both, Increase in temperature and decrease in molar ratio of MeIM/$Zn^{2+}$ had increasing effect on ZIF-8 particle size, pore size, pore volume, crystallinity and BET surface area of all investigated samples.

* Corresponding author:
R. M. Behbahani
Tel.: +98-9163187818, Fax: +98-61-35551754
E-mail address: behbahani@put.ac.ir (R.M. Behbahani).