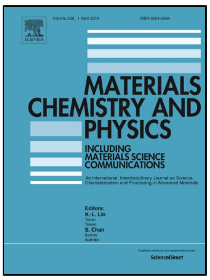
Accepted Manuscript



Size effects in physicochemical processes in nanoparticles and nanopores

V.V. Levdansky, O. Šolcová, P. Izák

PII:	S0254-0584(18)30107-X
DOI:	10.1016/j.matchemphys.2018.02.014
Reference:	MAC 20365
To appear in:	*Materials Chemistry and Physics*
Received Date:	25 April 2017
Revised Date:	05 November 2017
Accepted Date:	14 February 2018

Please cite this article as: V.V. Levdansky, O. Šolcová, P. Izák, Size effects in physicochemical processes in nanoparticles and nanopores, *Materials Chemistry and Physics* (2018), doi: 10.1016/j.matchemphys.2018.02.014

SIZE EFFECTS IN PHYSICOCHEMICAL PROCESSES IN NANOPARTICLES AND NANOPORES

V.V. Levdansky*, O. Šolcová, P. Izák

Institute of Chemical Process Fundamentals of the CAS, v. v. i., Rozvojova 135, 165 02 Prague 6, Czech Republic

Highlights

Size effects in nanoparticles and confined ionic liquids are considered.

Lower cohesive energy in nanoparticles increases rate of chemical reaction.

Laplace pressure in nanoparticles decreases rate of chemical reaction.

Confined ionic liquids in nanopores affect gas mixture separation.

Keywords:

Size effects;

Nanoparticles;

Nanopores;

Diffusion.

Abstract

Mass transfer and chemical reactions in nanoscale particles under the assumption of the size dependence of the cohesive energy or the influence of the Laplace pressure are considered. A comparison of the above-mentioned approaches is given. It is shown that the use of the first or second of the above-mentioned approaches can lead to a difference in the dependence of the rates of the aforementioned processes on the nanoparticle size. The influence of the confinement of ionic liquids within nanopores of supported ionic liquid membranes on the separation of gas mixtures is discussed. Considered regularities can be

*Corresponding author.
E-mail address: vlev5@yahoo.com (V.V. Levdansky).