



THE MECHANISM OF HYDROGEN BONDING IN ZEOLITE – EXPERIMENTS AND THEIR EXPLANATIONS

P. Lesnichenoks

*Riga Technical University
Azenes str. 14, LV-1048 Riga – Latvia*

L. Grinberga, J. Kleperis

*University of Latvia
Kengraga str. 8, LV-1063 Riga – Latvia*

ABSTRACT

Growing demands of increase of volume for hydrogen storage, for launching hydrogen industry, leads to new developments in industry and scientific investigation. Due to its structural variety and almost 3 million theoretical structural possibilities to create zeolite structures, it is a promising material for hydrogen storage. Economical convenience is a good reason to seek simple and common materials for storage systems. Natural materials in this case are especially interesting.

Although there are couple of theories about hydrogen's bonding with zeolite, such as adsorption, mainly through Langmuir equations, spillover effect – thanks to strong catalysts which manipulate hydrogen gas as well as atomic hydrogen, and basic filling of pores, also explained by Langmuir equations, results are not always consistent. While experimenting and using different methods to precise the mechanism of adsorption and measuring efficiency some irregularities has been found. Various experiments using mass spectroscopy, Sievert type – volumetric device and thermogravimetry are performed using natural zeolite (clinoptilolite). Angle of low pressure and normal temperature adsorption is investigated. Using these different methods for finding possible additive effects in hydrogen bonding process data is acquired and discussed.

Experimental documentation is encouraged for reassuring plane, expected and unexpected results, and personal experience about mishaps during experiments shared.

Keywords: zeolite, clinoptilolite, hydrogen storage, thermogravimetry