



---

## **ICEEM/01 – Environmental Engineering Section**

# **THERMODYNAMIC AND KINETIC STUDY OF GAS DESULPHURIZATION BY ADSORPTION ON ZEOLITES**

**Ion Untea<sup>\*</sup>, Dan Brasoveanu, Madeleine Dancila, Szidonia Bocskor**

*Politehnica University of Bucharest, Faculty of Industrial Chemistry*

---

### **Abstract**

Thermodynamic and kinetic data are presented, in order to compare the adsorption of SO<sub>2</sub> on natural and synthetic zeolites (Clinoptilolite, Mordenite, X, Y, ZSM-5 and Beta). The adsorption capacities determined on static conditions and on transient regimes are strongly dependent on the nature, structure and SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> molar ratio of the zeolites. The synthetic zeolites present greater capacities adsorption values compared to the natural ones. The natural clinoptilolite type zeolite presents low adsorption capacity for sulphur dioxide, but it reaches considerably higher values after chemical and thermal activation. The experimental adsorption isotherms are of I-type according to the Brunauer, Demming and Teller classification and fits with Langmuir-type isotherms. On the low temperature domain (20<sup>0</sup>C), the adsorption process is diffusionally controlled and the apparent diffusion coefficients values are related to the channels and access opening dimensions of the zeolite structures.

*Keywords:* zeolites, sulfur dioxide, adsorption.

---

---

<sup>\*</sup> Author to whom all correspondence should be addressed: Politehnica University of Bucharest, Faculty of Industrial Chemistry, Polizu Str.#1, Bucharest, ROMANIA, Tel. 0040-21-2129960, 0040-21-2129970 / 120, 122; E-mail: [untea@haste.ctap.pub.ro](mailto:untea@haste.ctap.pub.ro)