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MATHEMATICAL MODELING OF THERMAL DESORPTION USING LINEAR REGRESSION ANALYSIS

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Abstract

The article presents the development of a mathematical model concerning thermal desorption in a tubular electric furnace, using the linear regression analysis principle. With a range of experimental data obtained from some laboratory tests on water evaporation plus pollutant (Hexachlorocyclohexane - HCH), evaporation resulting from the application of thermal desorption on some soil samples; a mathematical model was developed to calculate the mass of substance evaporated from the soil according to the two important parameters of the process, namely the temperature (T) and the duration of maintenance (τ) in the furnace. By numerical simulation, for values of temperature (T) of: 200 °C, 350 °C, 500 °C, 650 °C and maintenance time (τ) of 5, 10, 15 and 20 minutes, it was calculated the mass of evaporated substance. To validate the experimental model, the reproducibility dispersion of results and the concordance dispersion were calculated. Results show that there is a good concordance between the experimental data and data calculated using the mathematical model.

Key words: mathematical modeling, temperature, thermal desorption, time

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