Adsorption Isotherm of Hydrogen and Methane on Activated Carbon

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In this work, a static volumetric method was experimentally implemented to measure the adsorption isotherm of hydrogen and methane by the activated carbon. The equilibrium data of stationary phase and mobile phase were correlated into the Langmuir, Freundlich, Langmuir-Freundlich, and Toth isotherms, and the comparisons between prediction values and experimental data were made. By a nonlinear regression analysis, the experimental parameters in the equilibrium isotherms were estimated and discussed. Then, the linear and quadratic equations for pressure and temperature to adsorption amounts and the regression coefficient were calculated. The adsorption amounts were more as the increase in pressure and the decrease in temperature. The hydrogen was not saturated in the pressure of 16bar, but the methane was saturated at 12bar.