

MODELING WATER SORPTION CAPACITY OF SILICA GEL

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Abstract

Silica gel is a widely used desiccant with a high water sorption capacity, influenced by factors such as specific surface area, pore volume, and pore size. This study develops mathematical models using multiple linear regression analysis (MLRA) to predict the water sorption capacity of silica gel based on experimental data. Independent variables include relative humidity (RH), specific surface area (SpBET), pore volume (Vp), and mean pore diameter (d). Pearson's correlation coefficient reveals strong positive correlations between water sorption capacity (w) and RH, and moderate correlations with SpBET, Vp, and d. Additionally, SpBET is strongly correlated with both Vp and d, while Vp and d also show a strong relationship. Two MLRA models were developed to predict sorption capacity: one based on RH and SpBET, and the other on RH and Vp. The R-squared values for these models were 0.886 and 0.902, respectively, indicating they are strong predictors of water sorption capacity in silica gel.

Keywords: *multiple linear regression analysis (MLRA), water sorption capacity, silica gel, model*