REMOVAL OF SOME HEAVY METALS FROM AQUEOUS SOLUTION BY KAOLINITE

Ömer YAVUZ1, Yağın ALTUNKAYNAK2, Fuat GÜZEL*2

1Department of Chemistry, Faculty of Sciences & Arts, Dicle University
2Department of Chemistry, Science Institute, Dicle University

21280 Diyarbakır, TURKEY

E-mail: omer@dicle.edu.tr

The problem of removing heavy metals from water is important and becoming more so with increasing industrial activities. Because the heavy metals in water are so numerous, only a non-specific process like adsorption seems to be appropriate for their removal. Several materials such as calsit, kaolinite, magadite and bentonite have been suggested as adsorbents of heavy metal ions in the literature.

This study represents an investigation of the removal of some heavy metals such as Mn(II), Co(II), Ni(II), and Cu(II) from aqueous solution using a natural kaolinite. The time to achieve absorption equilibrium was determined as 2 hours. It was observed that adsorption isotherms of heavy metals obeyed Langmuir adsorption isotherm. Langmuir Cm constants for each metal were found as 0.446 mg g⁻¹ (Mn), 0.919 mg g⁻¹ (Co), 1.669 mg g⁻¹ (Ni), 10.787 mg g⁻¹ (Cu) at 25 °C and as 0.431 mg g⁻¹ (Mn), 1.470 mg g⁻¹ (Co), 2.79 mg g⁻¹ (Ni), 11.037 mg g⁻¹ (Cu) at 40 °C; b constants for the metals were determined as 0.067, 0.108, 0.112, 0.155 at 25 °C and as 0.142, 0.167, 0.240, 0.348 at 40 °C, respectively.

Results indicates that kaolinite shows the following absorption affinity order for the metal ions; Cu²⁺ > Ni²⁺ > Co²⁺ > Mn²⁺.

KAYNAKLAR