

ABATEMENT OF PHENOL CONTENT OF WASTEWATERS ON MIXED (Al-Fe) AND (Al-Cu) PILLARED CLAYS

POPOVICI, E.,¹ PODE, R.,¹ HRISTODOR, C. M.,² HANU, A. M.²

¹ Faculty of Industrial Chemistry, "Gh. Asachi" Technical University [Facultatea de Chimie Industrială, Universitatea Tehnică "Gh. Asachi"], bd. Mangeron 53a, Iași, 700050, Romania

² Faculty of Chemistry, "Al. I. Cuza" University [Facultatea de Chimie, Universitatea "Alexandru Ioan Cuza"], bd. Carol I 11, Iași, 700506, Romania

E-mail: evelinpopovici@yahoo.com

Generally, the aqueous streams by chemical and related industries contain organic pollutants such as phenolic compounds, which are toxic and poorly biodegradable. In some cases these polluting agents are in very low concentrations, so that the recovery is not economically possible. In other cases, these polluting agents are in very high concentrations so that direct biological treatment is not appropriate. In these cases, it is necessary to use efficient and inexpensive treatments, such as wet peroxide oxidations. In the classical version of this process, Fenton's reagent ($\text{Fe}^{2+} / \text{Fe}^{3+} / \text{H}_2\text{O}_2$) was used.

In this paper the catalytic wet oxidation of phenolic wastewater by hydrogen peroxide (0.1–0.2 mol/l), at room temperature, by mixed (Al-Cu) and (Al-Fe) pillared clays (Al-Cu = 3:1; Al-Fe = 3:1), at pH = 3.5–5.0, was studied. Phenol oxidation was carried out in a thermostated glass

batch reactor of 250 ml equipped with a magnetic stirrer, a reflux condenser and a pH electrode. Phenol concentration was determined spectrophotometrically.

This study stress that the studied mixed pillared clay samples exhibit an interesting activity, allowing the total abatement of phenol concentration of wastewaters. Due to its stability and catalytic activity, the mixed Al-Fe and Al-Cu pillared clays could be one of the most promising catalysts.

References

FAJERWEG, K., DEBELLEFONTAINE, H. (1996): Applied Catalysis – B. Environmental, **10**, 229–235.

FINI, N., CRESPIAN, M., TRABELSI, M. (1997): Applied Clay Science, **12**, 281–292.

HAYEK, N., DOTE, M. (1990): Water Research, **24**, 973–982.

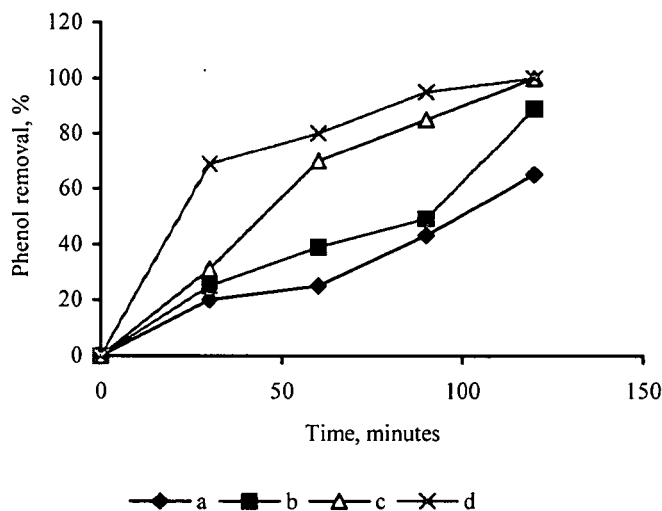


Fig. 1: Phenol removal by different samples:
a) 3Al/Cu PILC, pH = 3.5; b) 3Al/Fe PILC, pH = 3.5;
c) 3Al/Cu PILC, pH = 5.0; d) 3Al/Fe PILC, pH = 5.0