

Degradation of azo dyes by rapidly solidified metallic particles

W. ben Mbarek¹, E. Pineda², M. Khitouni¹, N. Fiol³, L. Escoda³, J.J. Suñol³

¹ Université de Sfax, Faculté des Sciences, B.P. 1171, Sfax, Tunisia.

² Universitat Politècnica de Catalunya, Dept. Física i Enginyeria Nuclear, ESAB, 08660 Castelldefels, Catalonia, Spain.

³ Universitat de Girona, P-II Campus Montilivi, 17071, Girona, Catalonia, Spain.

eloi.pineda@upc.edu

Azo compounds are one of the most common families of dyes used in textile and leather treatments. An important step during the treatment of water polluted by these compounds, is the degradation of the compounds by decomposition of the -N=N- bonds, producing the de-colorization of the water. This de-colorization reaction can be activated by the presence of zero valent metallic particles. The metastable structures generated during rapid solidification tend to increase the chemical activity of the alloys. Recently, it has been discovered that the use of metallic particles in a metastable phase (amorphous or nanocrystalline) multiplies significantly the efficiency of the de-colorization water-treatment step. Here we present the results obtained in the de-colorization of water using alloys based on different metals (Fe, Mn, Ni and Al) produced by rapid solidification and posterior ball milling. For some Al-containing alloys the results show a fast reaction, even in neutral pH conditions. In this work, the efficiency of the different metastable alloys in the de-colorization process, the effects of the metastable structure and the processing conditions are presented and assessed.