

## Degradation of textile dyes in aqueous solutions using type-Fenton bimetallic zeolite catalysts

Bebiana L.C. Santos<sup>1\*</sup>, António M. Fonseca<sup>1,2</sup>, Isabel C. Neves<sup>1,2</sup>

<sup>1</sup>Center of Chemistry, Chemistry Department, University of Minho, 4710-057 Braga, Portugal

<sup>2</sup>CEB – Center of Biological Engineering, University of Minho, 4710-057 Braga, Portugal

\*e-mail del autor de contacto E-mail: [jd7175@alunos.uminho.pt](mailto:jd7175@alunos.uminho.pt) and [ineves@quimica.uminho.pt](mailto:ineves@quimica.uminho.pt)

Textile dyes are growing to be a problematic class of pollutants to the environment. The disposal of dyes in water resources has bad aesthetic and health effects, since most of them are carcinogenic and mutagenic [1,2], so it is important to remove them from the environment. Effective and economic treatment by advanced oxidation processes (AOPs) has been attracted great and continuous interest for the degradation of these pollutants [3]. The heterogeneous Fenton-like processes have been paid great attention for its low cost, high efficient and mild conditions among these AOPs processes (20-50°C and atmospheric pressure) [3,4]. Recently, several iron- and copper- based heterogeneous Fenton catalysts have been investigated to be efficient catalytic systems [4]. In this work, in the preparation of type Fenton catalysts, zeolite NaY was used to support Fe, Cu and Mn. The type-Fenton catalysts, mono and bimetallic, were prepared by ion exchange method and the catalysts were tested in degradation of textile dyes in a batch reactor using H<sub>2</sub>O<sub>2</sub> at different temperatures and atmospheric pressure. It was observed that iron type-Fenton catalysts are active for the degradation of dyes, but when the reaction is performed with bimetallic type-Fenton zeolite catalysts the degradation becomes faster.

### Acknowledgements

This work has been developed under the scope of the projects: BioTecNorte (operation NORTE-01-0145-FEDER-000004), PTDC/AAGTEC/5269/2014, and Centre of Chemistry (UID/QUI/00686/2013 and UID/QUI/0686/2016).

### References

- [1] M.M.F. Silva, M.M. Oliveira, M.C. Avelino, M.G. Fonseca, R.K.S. Almeida, E.C. S. Filho, Chem. Eng. J., 2012, 203, 259–268.
- [2] M.A.M. Salleh, D.K. Mahmoud, W.A.W.A. Karim, A. Idris, Desalination, 2011, 280, 1–13.
- [3] M.L. Rache, A.R. García, H.R. Zea, A.M.T. Silva, L.M. Madeira, J.H. Ramírez, Appl. Catal. B: Environ., 2014, 146, 192–200.
- [4] Ch. Zheng, Ch. Yang, X. Cheng, Sh. Xu, Zh. Fan, G. Wang, Sh. Wang, X. Guan, X. Sun, Separation and Purification Technology, 2017, 189, 357–365.