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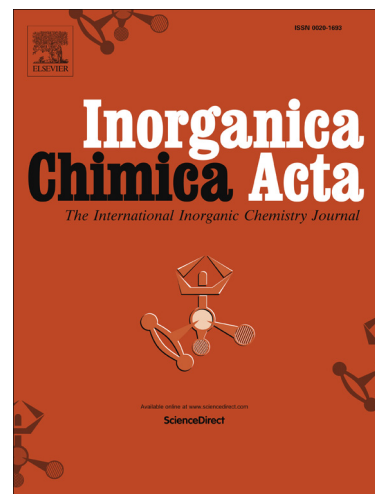
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Monitoring Cobalt Ions Siting in BEA and FER Zeolites by *in-situ* UV-Visible spectroscopy: a DRS study.

S. Castilho, A. Borrego, C. Henriques, M. F. Ribeiro, A. Fernandes^{a*}.

CQE, Centro de Química Estrutural, Instituto Superior Técnico, University of Lisbon,
Av. Rovisco Pais, 1049-001 Lisboa, Portugal

*Corresponding author, auguste.fernandes@ist.utl.pt

ABSTRACT

Two series of cobalt exchanged BEA and FER zeolites were obtained by using two distinct preparation methods to introduce the metal through ion-exchange, the conventional method and a microwave (MW)-assisted method. The different Co-based zeolites were characterized by the means of spectroscopic UV-Visible technique and chemical analyses and compared in terms of efficiency in cobalt introduction and cobalt siting within the pores of BEA and FER structure. A first concluding result relates with the implementation of a quantitative Co UV-Vis analysis, a simple method that can easily substitute time consuming and expensive chemical analyses. From the analysis of DRS UV-Vis spectra obtained for materials with cobalt contents from 0.01 to 3 wt.%, and assuming different Al framework distributions, it was possible to identify the siting of Co cations or the occurrence of oxidic Co species. For both zeolites, conventional and microwave-assisted ion exchange led to similar Co distributions over sites α , β and γ , although in the latter case the final amount of Co is substantially lower. Moreover, microwave radiation seems to be an interesting tool to prepare metal-based zeolites with interesting catalytic oxo-cations and/or cobalt oxide.

Keywords: Cobalt, BEA, FER, Microwave, ion-exchange, *in-situ* DRS spectroscopy.

1. INTRODUCTION

Metals incorporated into microporous (zeolites, aluminophosphates, etc.) and mesoporous molecular sieves, either directly within the framework (during hydrothermal synthesis) or introduced by post-synthesis methods (ion-exchange, impregnation, solid-state reaction, etc.) have been widely investigated over the last two decades for their promising catalytic properties [1-6]. In particular, metal-based zeolites

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