

## ABSTRACT

This thesis is focused in the field of synthesis of new microporous materials (zeolites) with potential industrial applications. Zeolites have a wide spectrum of applications in catalysis, gas separation, biomedical, electronics... due to their thermal and chemical stability and the molecular dimensions of their channels.

The main objective of this thesis is the study of phosphonium cations ( $R_4P^+$ ) as new Structure Directing Agents (SDAs) for the zeolite synthesis. Thus, broadening the range of organic cations employed in the preparation of zeolites, which up to now, is dominated by quaternary ammonium salts as de main SDAs.

The experimental procedure involves the preparation of phosphonium cations, the study of the influence of  $PR_4^+$  during zeolite crystallization conditions in the presence of these cations and finally, the comprehensive characterization of the zeolites by using a serie of spectroscopic techniques. The zeolite materials have been obtained as heteroatom substituted-zeolites (Al, B, Ge, Ti...) and then, the corresponding acid or redox properties have been characterized.

The ultimate goal of this work is to synthesize new microporous materials with potential applicability in industry.