Title: **Synthesis of mesityl oxide from acetone using acidic ion-exchange resins as catalysts**

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En Acetone, one of the most widely used organic solvents, is mainly synthesized from crude oil. However, in recent decades, other more sustainable production processes have been gaining importance. Acetone, in addition to being able to be produced via biosynthetic routes, can be a starting chemical for synthesizing a range of solvents of chemical interest. One of the solvents produced from acetone is mesityl oxide, formed through a two-reaction in series system via acid catalysis, for example by ion exchange resins. As they are solid catalysts, the separation of the final product is a straightforward process. However, they can present transfer limitations through the phases and limit the reaction, therefore, the accessibility to the active centres of the catalysts plays a fundamental role in the progress of a reaction. The catalytic activity will depend on the catalyst morphological properties and the nature of the active sites. In the present project, the liquid-phase synthesis of mesityl oxide is studied over a wide array of macroporous ion exchange resins. The main aim is to identify the catalyst properties that favor the formation of mesityl oxide.

From the experiments performed, the results obtained at he explored conditions indicated high selectivity for all the catalysts used and noteworthy, by-products were not detected in any of the runs performed excepting for the mesityl oxide isomer, which was obtained in very low amount. The acetone conversions ranged 3-15%. The experimental initial formation rates of mesityl oxide are estimated and related to the properties of the resins studied. As a main conclusion, high acid capacity was found to be the most relevant property, combined with a low ability to swell in the reaction medium, promoting eventually the synthesis of mesityl oxide. Among the catalysts studied, the best resin in terms of conversion, selectivity and conversion formation rates is A-35.

Keywords: Mesityl oxide, ion exchange resins, macroreticular, swelling, catalytic activity.