List of publications:

1. **Shital A. Kakade**, Nandini P. Hilage, *Transition Metal Chemistry*, **32**(2007)940.
2. **Shital A. Kakade**, Amit S. Varale, Vilas Y. Sonawane, Nandini. P. Hilage, Accepted for publication in *Journal of Indian Chemical society* (2008).

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idation of benzyl alcohol by Cr^{VI} supported on Ambersep 900 (O^-H) – a kinetic mechanistic investigation

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oxidation of benzyl alcohol was found to proceed through ester formation. In a slow step the ester decomposes produces chromium(IV). Chromium(IV) formed in a slow step, oxidizes another molecule of benzyl alcohol use our oxidant was supported on polymeric material and generates a free radical in a fast step. The free radical sequently reacts with another oxidant site in a polymeric reagent in a fast step and forms chromium(V). In a last the intermediate chromium(V) reacts with benzyl alcohol to produce benzaldehyde. The mechanism was licted and activation parameters were also determined.

oduction

omium oxide (chromium trioxide) dissolves in er and forms chromic acid, which is used as a verle oxidizing agent. The major use of chromic acid synthetic chemistry is in the oxidation of primary secondary alcohols to aldehydes and ketones ectively. The primary alcohols are less satisfacto- oxidized because of further oxidation of the alde- e to the corresponding carboxylic acid. Chromic l [1, 2] is used to oxidize various alcohols

he present work, namely, oxidation of benzyl alco- using polymer-supported agent, is quite meager [3]. hough a large number of reagents are known in the rature [4] for such transformation of alcohol to ehyde, there is still need either to improve the exist- oxidation method [5] or to introduce new reagent o obtain better selectivity under milder conditions.

n synthetic organic chemistry, oxidation under se transfer catalysis [7] finds wide application, but g polymer supported oxidizing agents [8] for etic and mechanistic studies are limited. The poly- r supported oxidizing agent can used and be reused hout loss of capacity, and also very easy work up l safety are the major factors of interest for the sent study. By use of polymer supported oxidizing nt the side reaction decreases and the oxidation cess stops at the product aldehyde step only.

or chemical and mechanical stability, cross-linked ystyrene (with varying % of DVB) is used nowadays, l also because the polymer swells strongly in several vents .The reactions carried out using such cross- ked polymer result in high yield transformation. Considering all these advantages the title reaction, in which polymer supported chromic acid is used as an oxidant, was investigated and the results are given below.

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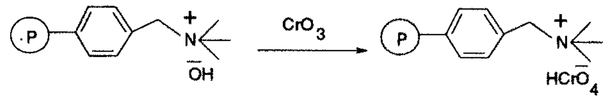
Experimental

Preparation of polymer bound – chromium(VI) oxide

The polymer bound chromium(VI) oxide was prepared [9–11]. The hydroxide form of Ambersep 900 (O^-H) [a macro reticular anion exchange resin] containing a quaternary ammonium group [10×10^{-3} kg] was stirred with a saturated solution of chromium trioxide [5×10^{-3} kg] in water [30×10^{-3} dm^3] for 30 min at room temperature using a magnetic stirrer. Hydroxide ion was readily displaced and $HCrO_4^-$ form of resin was obtained in 30 min. The resin was successively rinsed with water, acetone and ether and finally dried in vacuum at 50° for 5 h. The dried form of the resin was stored and used throughout the kinetic study.



Determination of the capacity of the chromate form of polymeric reagent

The capacity of the chromate form of polymeric reagent was determined iodometrically.

The capacity of the chromate form of Ambersep 900 resin – 6.55 mmol/g, is used for the kinetic study throughout the work. Other chemicals like 1.4dioxane (A.R.), chloroform, cyclohexene, carbon tetrachloride, (Merck) and benzyl alcohol used were purified and stored.