OXIDATION OF AN ARYLALKYL OR ITS DERIVATIVE TO ITS CORRESPONDING CARBONYL OR CARBOXYLIC ACID

IITM Technology Available for Licensing

PROBLEM STATEMENT & UNMET NEED

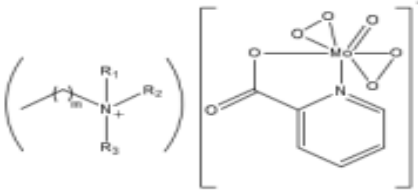
- Traditional methods of oxidation invariably involve addition of stoichiometric quantity of oxidants; nevertheless, the **co-production** of disagreeable **toxic by-products** is a matter of **serious environment** concerns.
- Further the methods for oxidation or dehydrogenation of alkylarenes and its derivatives to respective carbonyls (including carboxylic acids) require **costly metals(**Rh, Ir, Ru, Pt, Pd, or Os), mixed metal catalysts such as (Pb-Bi)2+xRu2-xO7-y, Pt/Bi-Al2O3, Au-CeO2 or Au/Cu-CeO2 and Cu-Ni, equimolar amount of base & pressurized oxygen in autoclave reactors, as well as **different constraint**.
- Hence there is a need to address above issues.

TECHNOLOGY CATEGORY/ MARKET

Technology: Oxidation of an arylalkyl or its derivative to its corresponding carbonyl or carboxylic acid;
Industry: Chemical Plant, **Applications:** Pharmaceutical & chemical synthesis;
Market: The global catalytic oxidation is projected to grow at a **CAGR of 6.8%** during 2021 to **2029**;

TECHNOLOGY

- The present invention describes a process for **oxidation of an arylalkyl** or **its derivative to its corresponding carbonyl or carboxylic acid**.
- The process comprises the step of reacting the **arylalkyl** or its derivative, **in water**, with **aqueous TBHP** as an **oxidant**, in presence of a **catalyst of formula (I)**: wherein, each of R1, R2, and R3, independently, is alkyl, alkenyl, or alkynyl; **and m is 0- 20**.



- Further Patent relates to a process for **preparing** a catalyst of **formula(I).**
- Said catalyst of formula (I) as used in the process of the present invention can be **recovered** from the **reaction mixture** & **recycled or reused.**
- The catalyst may be recycled **eight times** for successful **oxidation reactions** without any significant loss of yield. (Fig.1)

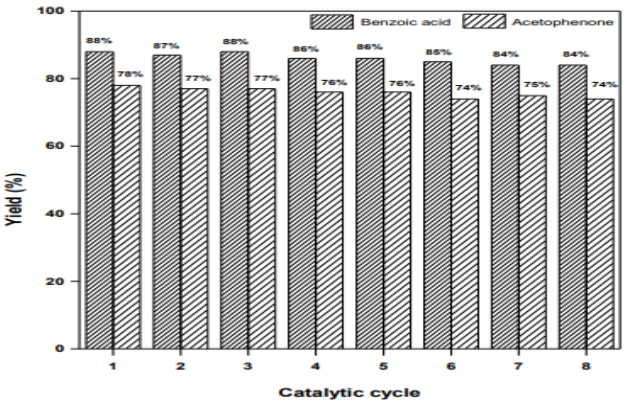


FIG.1

KEY FEATURES / VALUE PROPOSITION

❖ ***Technical Perspective:*** The claimed process of oxidation of an arylalkyl or its derivative yields corresponding carbonyl or carboxylic acids in excellent yields (up to **98% yield** & **100% conversion**).

❖ ***Industrial Perspective:*** The claimed process does not involve any harmful vigorous oxidant, and/or organic solvent & the process is **simple, cost effective, & environment friendly.**

INTELLECTUAL PROPERTY

IITM IDF Ref. 1947; Patent No: 398304

TRL (TECHNOLOGY READINESS LEVEL)

TRL- 3, Proof of Concept ready & validated

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