Claims

1. Method for reactivating a catalyst system wherein

• an unsaturated organic compound is epoxidized in a reaction mixture,

• the reaction mixture comprises a homogeneous catalyst system for the epoxidation of the unsaturated organic compound and at least one peroxide,

• the catalyst system comprises at least one derivative of a metal in its highest oxidation state, wherein the derivative is selected from H_2WO_4 and $H_2M_0O_4$ or the alkali metal and alkaline earth metal salts thereof, and phosphoric acid or the salt thereof, and

• the catalyst system is separated from the epoxidized organic compound prior to the reactivation and the catalyst system after the reactivation is recycled to the reaction mixture,

characterized in that the catalyst system is reactivated by addition of at least one aqueous base at a pH ≥ 4.

2. Method according to Claim 1, characterized in that the reaction mixture comprises an aqueous phase and an organic phase and also a phase transfer reagent.

3. Method according to Claim 2, characterized in that the oxidation is carried out at a pH ≤ 4.

4. Method according to Claim 3, characterized in that to adjust the pH to ≤ 4, at least one inorganic acid having a pK_a (25°C) of 2.5 or less is selected.

5. Method according to any of the preceding claims, characterized in that the pH of the catalyst system after the reactivation and before the feed is adjusted to a value of <7.

6. Method according to any of the preceding claims, characterized in that an organic phase optionally present is removed after the reactivation and before the feeding to the reaction mixture.

7. Method according to any of the preceding claims, characterized in that the peroxide used is hydrogen peroxide.

8. Method according to any of the preceding claims, characterized in that the base is selected from ammonia, alkali metal hydroxides or mixtures thereof.

9. Method according to Claim 8, characterized in that the alkali metal is selected from sodium and potassium.

10. Method according to any of the preceding claims, characterized in that the organic compound is an unsaturated cyclic compound having six to twelve carbon atoms.

11. Method according to at any of the preceding claims, characterized in that the epoxidation takes place without organic solvent.

12. Method for the epoxidation of unsaturated organic compounds by means of peroxides, wherein a homogeneous epoxidation catalyst system is used, which comprises at least one derivative of a metal in its highest oxidation state, wherein the derivative is selected from H_2WO_4 and $H_2M_0O_4$ or the alkali metal and alkaline earth metal salts thereof, and phosphoric acid or the salt thereof, characterized in that the catalyst system is reactivated by addition of at least one aqueous base at a pH ≥ 4 and the catalyst system is separated from the epoxidized organic compound prior to the reactivation and the catalyst system after the reactivation is recycled to the reaction mixture.

13. Method according to Claim 12, characterized in that the catalyst system is reactivated by addition of at least one aqueous base at a pH ≥ 4.5.

14. Method according to Claim 12, characterized in that the catalyst system is reactivated by addition of at least one aqueous base at a pH ≥ 7.

15. Method for the synthesis of lactams comprising the steps of:

- epoxidation of a cyclic unsaturated compound to the epoxide,
- rearrangement to the ketone,
- oximation to the oxime and
- rearrangement to the lactam,

wherein the cyclic unsaturated compound is epoxidized in the presence of a homogeneous oxidation catalyst system, characterized in that a reactivation of the catalyst system is carried out according to a method of Claims 1 to 11.