

## Application of magnetic iron oxide nanoparticles in catalysts as catalyst base

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### ABSTRACT

When synthesizing magnetic nanoparticles, some key conditions such as inherent magnetic properties, size and shape of nanoparticles, surface coatings and surface charge of nanoparticles, stability in aqueous medium and their non-toxicity should be considered. By choosing a suitable synthesis method, the size, shape, surface coating and colloid stability of the magnetic nanoparticles can be controlled optimally. In the selection of magnetic matter, iron oxides have good magnetic properties compared to other magnetic nanoparticles, and, on the other hand, exhibit high stability against degradation. These nanoparticles also have lower toxicity. To date, various methods have been developed for the synthesis of magnetic nanoparticles. This article will explain some of them.

**Keywords:** nanoparticles, magnetic nanoparticles synthesis, catalyst, tungsten phosphoric acid, magnet, heterogeneous

### INTRODUCTION

The application of magnetic nanoparticles in the catalysts as a catalyst base has been very much considered due to good spread, high surface to volume ratio, ease of surface modification and very easy and effective separation of the reaction medium.

Acid stabilization on a magnetic nanoparticle is not a problem for the magnetic core, and it is also possible to reuse the catalyst. The stability of magnetic nanoparticles coated in the acidic environment depends on their coating diameter. Sometimes they can be kept in acidic environments for some time. The magnetic nanoparticles produced in this work are not used in acidic environments, but contain acidic groups on their outer layers. In this research, tungsten phosphoric acid (TPA) is fixed on silica-based core-coated magnetic nanoparticles and used to sterilize various alcohols and acids. The new aspect of this method is a very easy catalytic separation from the reaction medium by the magnet.



Synthesis of Iron Oxide Magnetic Nanoparticles by Thermal Solvent (Solvothermal)  
To prepare magnetic nanoparticles in a 250 ml human, add 3.6 grams of acetate 3 above, 1.35 g of iron chloride 6 abe and 50 ml of ethylene glycol to the reaction solution. Then, using a suitable