Preparation of Nitrones Using $\gamma$-Fe$_2$O$_3$@SiO$_2$-$\text{H}_3\text{PW}_{12}\text{O}_{40}$

Significance: The oxidation of secondary amines by superparamagnetic tungstophosphoric acid supported on silica-encapsulated $\gamma$-Fe$_2$O$_3$ ($\gamma$-Fe$_2$O$_3$@SiO$_2$-$\text{H}_3\text{PW}_{12}\text{O}_{40}$) was carried out with an aqueous hydrogen peroxide as oxidant to give the corresponding nitrones 1a–h in up to 90% yield.

Comment: The $\gamma$-Fe$_2$O$_3$@SiO$_2$-$\text{H}_3\text{PW}_{12}\text{O}_{40}$ nanoparticles were readily recovered by an external magnet and reused three times without significant loss of catalytic activity (1st reuse: 1a 85% yield, 3rd reuse: 1a 80% yield). The authors previously reported the preparation of $\gamma$-Fe$_2$O$_3$@SiO$_2$-$\text{H}_3\text{PW}_{12}\text{O}_{40}$ and its application to the synthesis of formamidines (J. Mol. Struct. 2012, 1027, 156).