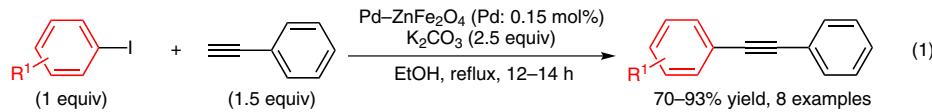


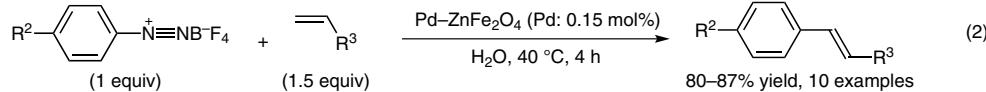
A. S. SINGH, S. S. SHENDAGE, J. M. NAGARKAR\* (INSTITUTE OF CHEMICAL TECHNOLOGY, MUMBAI, INDIA)

Palladium Supported on Zinc Ferrite: An Efficient Catalyst for Ligand-Free C–C and C–O Cross-Coupling Reactions  
*Tetrahedron Lett.* **2013**, *54*, 6319–6323.

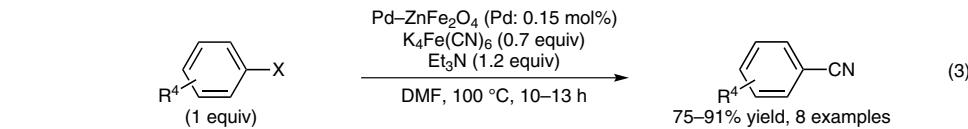
## Ligand-Free C–C and C–O Cross-Couplings with Pd–ZnFe<sub>2</sub>O<sub>4</sub>



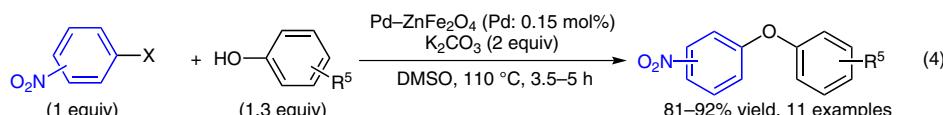
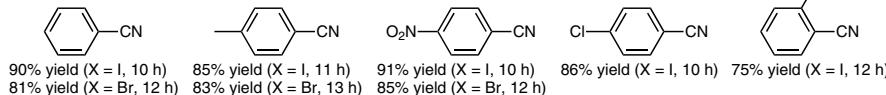
**Selected results:**



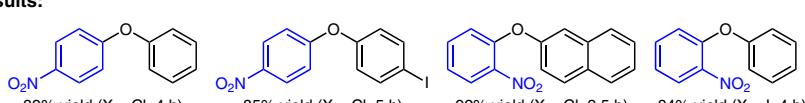
**Selected results:**



**Results:**



**Selected results:**



**Significance:** The superparamagnetic Pd–ZnFe<sub>2</sub>O<sub>4</sub> catalyst was prepared by adding palladium nanoparticles into a suspension of ZnFe<sub>2</sub>O<sub>4</sub> magnetic nanoparticles in water. Pd–ZnFe<sub>2</sub>O<sub>4</sub> catalyzed the Sonogashira coupling (8 examples, eq. 1), the Heck–Matsuda coupling (10 examples, eq. 2), the cyanation of aryl halides (8 examples, eq. 3) and the Ullmann coupling (11 examples, eq. 4).

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**Comment:** In the Sonogashira coupling of iodo-benzene with phenylacetylene and the Ullmann coupling of 4-nitrochlorobenzene with phenol, the catalyst was recovered and reused twice without significant loss of catalytic activity.