

## **Silica-coated magnetic palladium nanocatalyst for Suzuki-Miyaura cross-coupling**

### **ABSTRACT**

A silica-coated magnetically separable Schiff-base palladium nanocatalyst was developed. Amorphous silica was used to encapsulate the magnetic Fe<sub>3</sub>O<sub>4</sub> and an organic amine functionality was added to the silica surface. The amino group was treated with 1, 10-phenanthroline-2,9-dicarboxaldehyde to produce a Schiff-base, which was then treated with palladium to produce the silica coated magnetic Schiff-base palladium nanocatalyst. The palladium nanocatalyst was fully characterized using several spectroscopic techniques. The HR-SEM image of silica coated Fe<sub>3</sub>O<sub>4</sub> revealed a globular shape with a diameter of 145 nm, along with this the average palladium nanoparticle size was  $3.5 \pm 0.6$  nm. The successful functionalization and the appearances of the palladium species as a magnetic catalyst was confirmed by FT-IR and XRD analysis. The palladium nanocatalyst was successfully applied for the construction of CAC bonds via Suzuki- Miyaura reaction. With a variety of organoboronic acids, the catalyst displayed great performance for electron-poor and electron-rich aryl halides, resulting in excellent yields of the corresponding cross-coupling products. The magnetic catalyst was retrieved from the reaction vial using an external strong magnet, and it was reused seven times without a significant drop in the production of the corresponding biaryl product.