The Suzuki cross-coupling reaction is widely used to generate carbon-carbon bonds from boronic acids and halides. It is successfully applied in homogeneous and heterogeneous synthesis of e.g. biaryl compounds. The formation of two phases during the reaction requires an intensive mixing in batch. A model substrate 4-bromotoluene reacts conveniently with phenyl boronic acid to give 1-methyl-4-phenylbenzene. Side products like biphenyl generated of two molecules phenyl boronic acid or benzene due to deboronation are easy to quantify.

4-Bromotoluene (98%, 0.25 mol), phenylboronic acid (99%, 0.25 mmol) were dissolved in ethanol (12.5 mmol) was added. To the stirred solution tetrakis(triphenylphosphine)palladium(0) (100 ppm Pd(PPH3)4) was added. After 5 min PPh3 was added. The concentration of the palladium catalyst relating to the reactants in EtOH, 25 °C, 1.5 bar (N2) was pointed out. Product, 1-methyl-4-phenylbenzene was isolated.

Without IL: In 202 seconds at 140°C TOF = 49.4 s⁻¹
With [C18MIM]Br 5: In 101 seconds at 160°C TOF = 96.8 s⁻¹

The obtained products were characterized by HPLC (Merck-Hitachi HPLC, A-4500 UV detector (250 nm), D-6000 PC-interface, Kromasil column 250 mm x 4 mm x 5 µm C18) with an isocratic method (34 % acetonitrile, 33 % methanol, 33 % water) and a flow rate of 1 mL · min⁻¹.

Below 140°C: residence time was not long enough for a completed cross coupling
Above 140°C: side reaction (terminal deboronation) increases
No side product of homo coupling could be detected
The catalytic solution including the IL was reused five times without loss of activity