

# Developments and Scale-Up in the Field of Industrially Relevant Flow Hydrogenation

## Abstract:

Recently we have performed a collaborative project to investigate highly exothermic nitroaromatic and heteroaromatic ring reductions. A series of specially designed catalysts were employed in packed bed continuous flow reactors. Key highlights from this work include:-

- highly selective reduction of halonitrobenzenes to haloanilines including o-chloroaniline, o,m,p-bromoanilines and o-iodoaniline (without catalyst doping)
- reduction of nitrobenzene to aniline
- reduction of nitrophenols to aminophenols
- reduction of pyridine, picoline and lutidine to the corresponding piperidine derivatives
- full and partial reduction of ethyl nicotinate
- use of a range of metal catalysts including sponge nickel and cobalt, palladium, platinum and rhodium with the option to use various bimetallic catalysts if advantageous.
- selective (100 fold) scale-up reactions run for o-bromonitrobenzene and quinoline reduction (solution flow rates >100ml/minute).

It will be demonstrated that this flow hydrogenation technology offers tremendous benefits, in terms of safety, selectivity, size of equipment, lower peak energy demand, yield and applicability to complex pharmaceutical substrates among others over traditional batch processing.

Speaker: **Dr Douglas McAndrew**

### **IntensiChem Ltd**

Unit 53, Maple Leaf Business Park  
Manston  
Kent  
CT12 5GD  
United Kingdom  
[www.intensichem.com](http://www.intensichem.com)



IntensiChem Ltd is a registered company in England and Wales, company number 7817087.  
Registered Address: 12 Romney Place, Maidstone, Kent, ME15 6LE