

## Monitoring Chemical and Biological Processes

InsightMR has a varied portfolio of applications for monitoring chemical and biological processes, to increase understanding of reaction mechanisms, radical formation and cell metabolism.

**InsightMR** “the classic”, enhances reaction understanding, and confidence when transferring processes from the laboratory to the manufacturing plant.

**InsightXpress** the “Tesla of reaction monitoring” and fastest of the family, enables monitoring of fast reactions and rapid, automated, screening of reaction conditions.

**InsightCell** monitors living cells to study their biological activity through direct measurement of variations in metabolite concentration.

**InsightEPR** (on display) is highly complementary to the classic InsightMR, monitoring processes involving radical formation.

### InsightMR

The InsightMR flow unit and dedicated software are ideal for both industrial and academic scientists studying or optimizing organic reactions.

The flow unit, equipped with temperature-controlled transfer lines, enables on-line monitoring of chemical reactions in real-time under real conditions. This is achieved by fast and continuous transfer of reaction mixtures from a reaction vessel into the flow tube, which is located in the NMR probe. The InsightMR flow unit is compatible with all 5 mm Bruker probes, making it a cost-effective, versatile solution.

Designed for use by both NMR experts and non-experts, InsightMR software enables straightforward monitoring of reactions in both deuterated and non-deuterated solvents. The system is up and running in minutes; further training is not required!

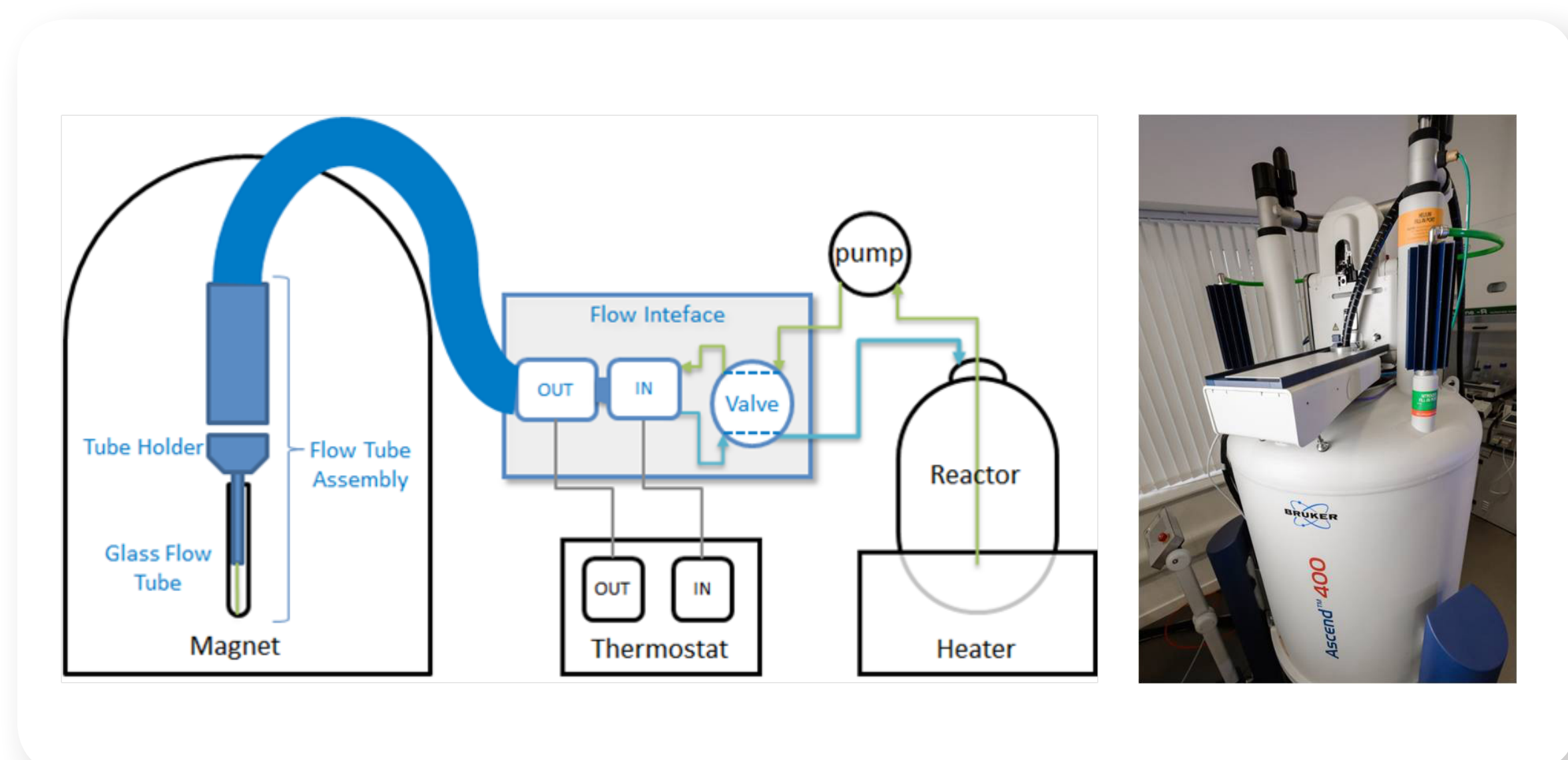


Fig. 1: InsightMR typical laboratory set-up for chemical reaction. From left to right: magnet (300-950 MHz) with flow tube inside, temperature controlled transfer lines, flow interface, thermostat, pump, reactor and heater. On the right hand-side, a 400 MHz Ascend magnet with InsightMR flow unit. Behind the magnet, there is a fume cupboard with the flow interface, a vessel, a pump and a thermostat.

## InsightXpress

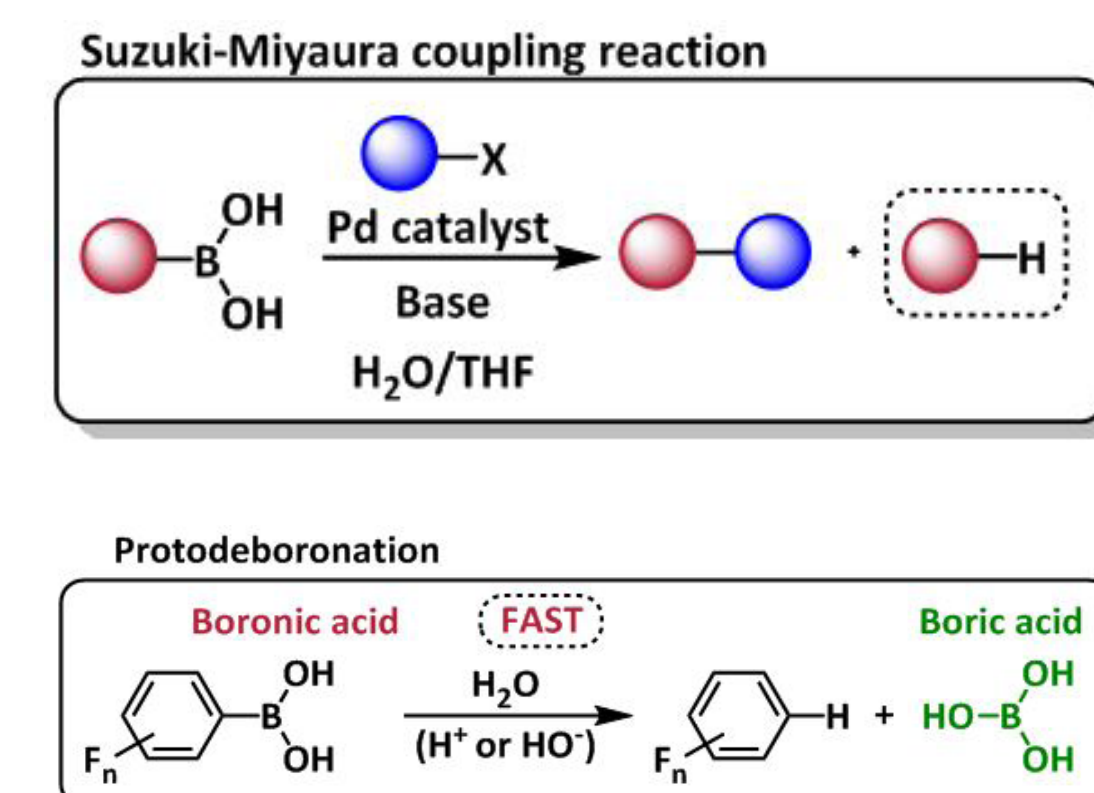
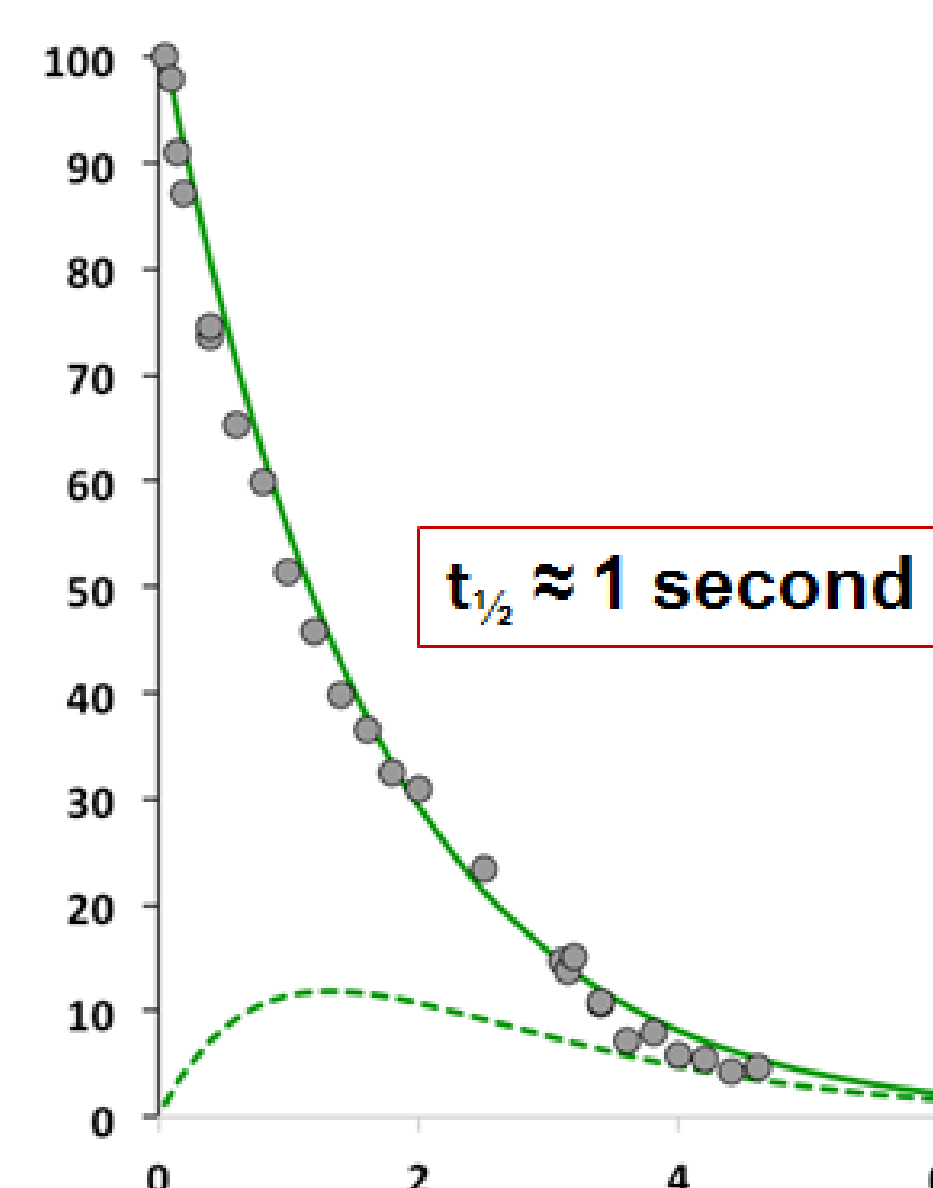


Fig. 2: Right: Suzuki-Miyaura coupling, one of the currently most utilized reactions in industry and its protodeboronation side reaction. Left: Kinetic profile showing the depletion of one of the reagents, with a half-life time of 1 s! Data acquired by Professor Guy Lloyd-Jones's group with InsightXpress.

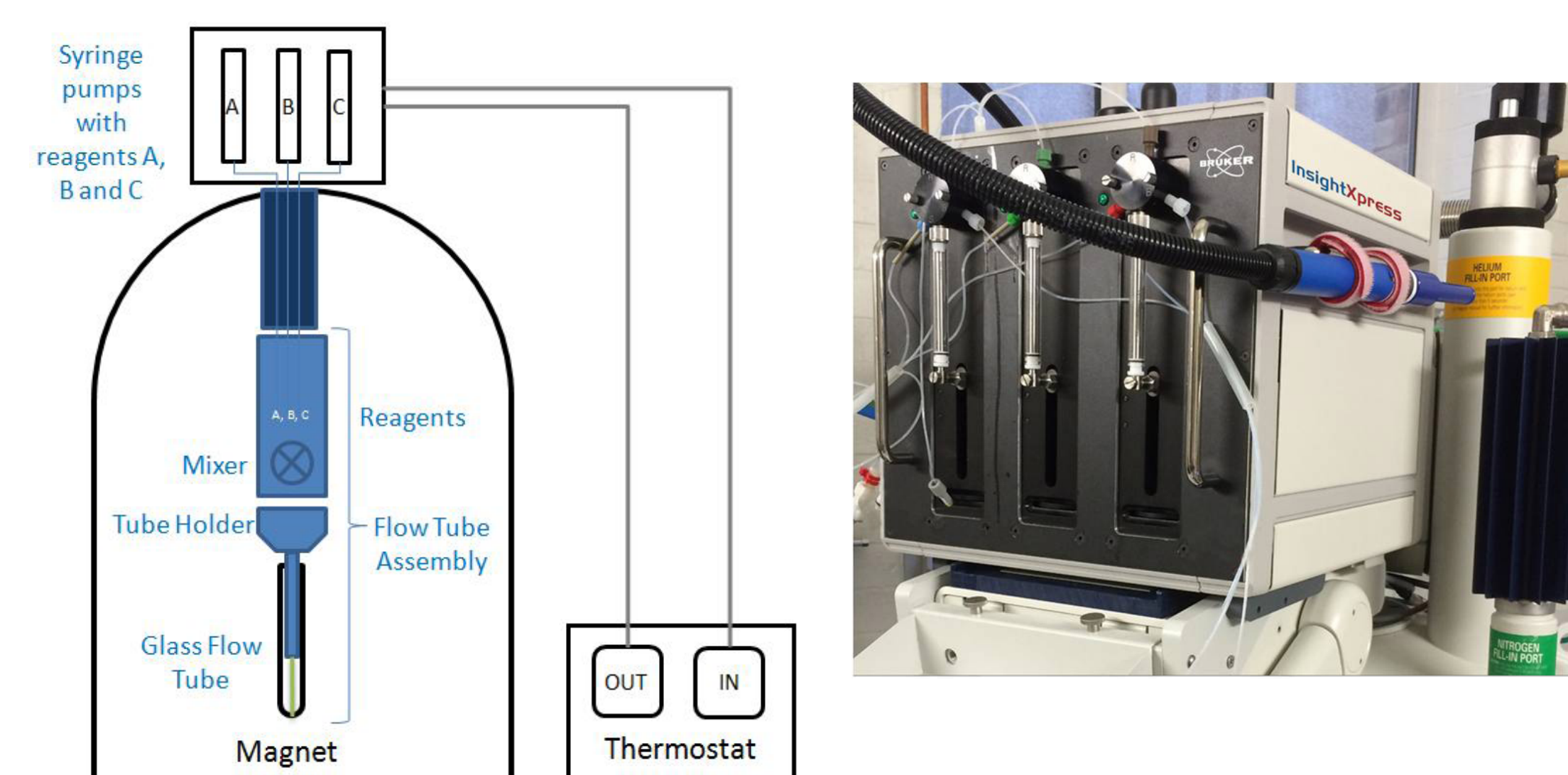


Fig. 3: InsightXpress set-up - magnet with a modified InsightMR unit inside, fast delivery pumps on top of the magnet.

InsightXpress's new stop-flow delivery pumps enable the screening of reaction conditions by NMR at an unprecedented speed. Using InsightXpress, Professor Lloyd-Jones and his co-workers gathered insights into the mechanism and kinetics of the Suzuki-Miyaura protodeboronation side reaction. They were able to monitor the decay of a reagent with half-life time of 1 s!\*

Insights into the mechanism and kinetics of chemical reactions are now at your fingertips!

\*Find out more details @ ENC poster session PH278

## Summary

- InsightMR portfolio, the next level of process and reaction understanding.
- InsightMR 'classic' for on-line real-time, real laboratory conditions, reaction monitoring.
- InsightXpress for rapid reaction optimization and fast reaction monitoring.