

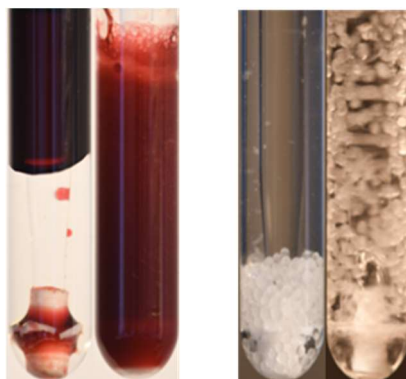
**Report of the results of the Proof of Concept funding for  
'Development of a Mechanically Stirred NMR Tube for in Situ Reaction Monitoring'**

Julien Landel, Ralph Adams and Jordi Bures

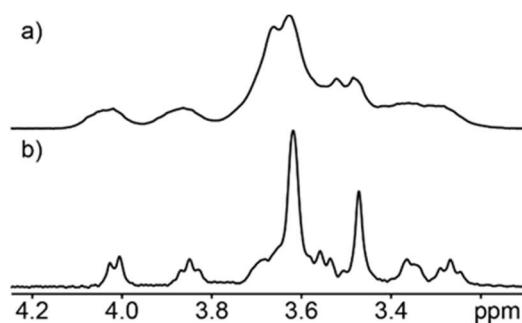
The University of Manchester

*We have used the £2k award to produce a prototype of a mechanically stirred NMR tube for in situ monitoring of reactions by NMR.*

We designed and 3D printed an NMR stirrer device for 10 mm NMR tubes. The device is made of materials compatible with its use inside of standard NMR spectrometers and is able to stir at 10,000 rpm. We achieved excellent mixing with simple impellers both for immiscible liquid-liquid mixtures and solid-liquid mixtures (Figure 1).



We have also adapted existing NMR methods to acquire NMR data of sucrose in D<sub>2</sub>O in the presence of sand as a solid while vigorously stirring the mixture (Figure 2).



These results have been used in support of a EPSRC Standard Grant proposal entitled “*Stirred, Not Shaken* – NMR Device for in Situ Monitoring of Heterogeneous Reactions”. This grant is a multidisciplinary proposal led by three early career researchers from The University of Manchester: Dr Jordi Bures (JB, physical organic chemist), Dr Ralph Adams (RA, NMR spectroscopist) and Dr Julien Landel (JL, fluid dynamicist). This proposal is perfectly aligned with the themes and initiatives of DaM, “Enabling Technologies for Synthesis” and “Data Driven Synthesis”.