Surfactants and Particles at Fluid Interfaces

Bernard P. Binks

University of Hull, Hull, UK.

Presenting author e-mail: B.P.Binks@hull.ac.uk

I started my research career in October 1983 as a PhD student funded by a BP Scholarship working on surfactant addition in connection with enhanced oil recovery. This led to around 15 years investigating surfactant behaviour at interfaces and in emulsions and foams.

In October 1998, funded by ICI Paints with a CASE studentship, I began work on the behaviour of small solid particles at liquid interfaces related to pigment flushing in colloidal paint systems. Intrigued by little activity globally since the pioneering paper by Pickering in 1907, we decided to systematically investigate the influence of particle hydrophobicity on their arrangement at planar oil-water interfaces and their stabilisation of emulsions for pure particles, both inorganic and organic. This led on to studying the preparation and properties of particle-stabilised foams and subsequently how particles adsorb at oil-oil, water-water and air-oil interfaces. New materials containing assembled particles at fluid interfaces resulted including dry water, powdered oil, oil foams and liquid marbles. Recently, we have been studying catalysis (chemical and bio-) in Pickering emulsions as a novel platform for synthesis.

In 2007, I wanted to explore what happens when surfactant and particles are present simultaneously, this being the case in many commercial formulations in the food, cosmetic, pharmaceutical and agrochemical industries. We have investigated emulsions and foams in the case of like charge on surfactant and particles and in the case of opposite charge. Stimuli-responsive dispersed systems result when either or both of the surfactant and particles is stimulus-responsive.

As I approach 40 years conducting scientific research I have had and continue to have a great time and owe huge thanks to the gifted PhD students, Postdocs., external collaborators and funding bodies who worked with me.