Surface effects in fouling and cleaning

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Fouling is the process by which surfaces become contaminated by other species. This can happen inside process plant, on the surfaces of food factories, and in the home. Fouling is a multiscale process; deposits form as the result of nano-scale interactions between deposit and surface, which scales up to the formation of mm-cm scale deposits on m-scale plant or surfaces.

Cleaning depends on the breakage of the bonds between surface and foulant, carried out by physical and chemical processes. The control and/ot understanding of interfacial behaviour is critical in cleaning. There has been extensive research on creating surfaces that have controlled interfacial proeprties, that can resist fouling or speed cleaning. These surfaces can be effective over small areas or in well-controlled situations, but it has not been possible to make fouling resistant surfaces that work for the time required for plant operation.

This presentation will review recent work in nano- to meso- scale fouling and cleaning research, demonstrating how better understanding of how materials adhere or are removed from surfaces could lead to new processes that are easier to clean, and thus use less energy and water in operation.