

UNDERSTANDING CHEMOMECHANICAL INTERACTIONS DURING HARD SURFACE CLEANING PROCESSES

Perrakis Bistis^{1,2}, Patricia Andreu Cabedo^{1,2}, Peter Fryer¹, Serafim Bakalis³, Michael Groombridge²

1. School of Chemical Engineering, University of Birmingham, Edgbaston, UK, B15 2TT
 2. Procter & Gamble, Newcastle Innovation Centre, Newcastle-upon-Tyne, UK, NE12 9TS
 3. School of Chemical Engineering, University of Nottingham, Nottingham, UK, NG7 2RD
- Presenting author email: pxb769@student.bham.ac.uk

The chemical function of detergents, has been carefully studied in the literature review, however, the chemical interactions with the surface that occurs during the cleaning process of hard surfaces, in combination with the mechanical interactions are still under investigation. So the purpose of this project is to understand the variables that affect cleaning and include them in models that will characterise this process.

To achieve the understanding of chemical and mechanical interaction during cleaning, the Mini Traction Machine (MTM) was used. The MTM is a tribometer that measures frictional properties of lubricated and unlubricated contacts. The main reason why this equipment was chosen, was to correlate cleaning rate with the friction applied during cleaning. For this purpose, tomato puree was placed on the discs and then in the oven (1h, 110oC). The mass of the burnt tomato was measured. The experiment was mainly examining the effect of different parameters such as normal load, speed, mass and concentration of surfactant.

The cleaning rate was steady throughout the whole cleaning process. The conclusions that can be extracted from the results are mainly about the effect of the different parameters in cleaning. The mass of tomato does not affect the cleaning rate. With an increase in load the cleaning rate is increasing as well, but the increase between 1 and 2.5 N is much larger than the increase between 2.5 and 5 N. By increasing the speed the cleaning rate is increasing as well. By adding a surfactant the cleaning rate seems mainly to stay constant. This probably happens because the detergents are adding lubrication to the system. The traction coefficient curves have similar behaviour in all cases.