Swansea University
Prifysgol Abertawe

COATED

USER CASE STUDY

HYBRISAN

Sponsor Research Engineer
Sean James

Assessment of the bactericidal activity of a novel polymeric biocide for coatings

Biofouling affects a broad range of industries from petrochemical to health sectors. Of the numerous adverse effects caused by the accumulation of biofilms two are of particular concern; microbial induced corrosion (MIC) with rates of 3mm per month reported within stainless steel systems, and, medical device colonisation a leading cause of nosocomial infection.

Sean has been working alongside Hybrisan to elucidate the mechanism through which a novel polymer based biocide can be implemented to control bacterial adhesion, prevent biofilm maturation, and destabilise established biofilms. Using classical microbial culturing techniques in conjunction with advanced microscopies, including: Atomic Force Microscopy (AFM) and Confocal Scanning Laser Microscopy (CLSM), Sean has been able to characterise both the minimum inhibitory and toxic concentrations as well as modification in bacterial surface charge and polarity. Further investigation into early biofouling events, in particular initial bacterial adhesion has implicated the biocide in the prevention of conditioning layer deposition and therefore biofilm formation.

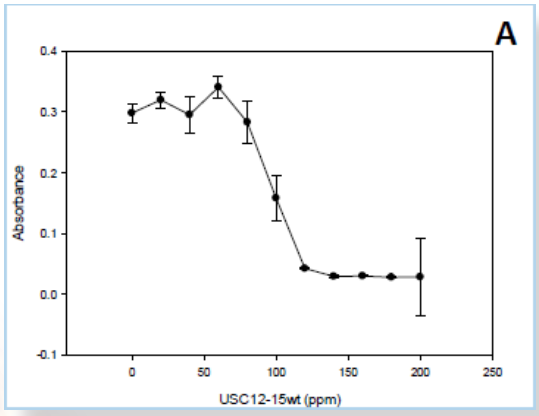

Figure 1. Graph showing the inhibition of microbial growth with increasing concentration of USC polymer biocide

The Industrial Impact

As a result of the information gained from this research Hybrisan have been able to refine their commercial product to the point that it has been accepted for trials at a large multi-national coatings manufacturer. Following a successful trial, it is hoped that this will lead to further contracts and the growth of this novel biocide product.

In addition, through their engagement with the COATED CDT, Hybrisan developed a working relationship with Tata Steel to evaluate their products in the water treatment facility at Tata Steel, Port Talbot. This business opportunity directly resulted from networking opportunities afforded through support of the CDT.

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