ABSTRACT

Gathering for a workshop hosted by Robert Field at Oxford University, some of the world’s leading experts in membrane fouling presented and discussed recent research progress in this area. The delegates paid particular attention to the key issue of biofouling because of its importance in water treatment and its inherent complexity compared to the mechanics of inorganic particulate fouling. It was remarked that the characterisation and understanding of the extracellular polymeric substances (EPS) in biofilms, and the transparent exopolymers (TEP) involved in their development is still a particularly difficult task, which was a subject present during the entire workshop. Furthermore, advances in characterisation of fouling layers and biofilms utilising ultrasonic time-domain reflectometry (UTDR) and confocal laser scanning microscopy (CLSM) were presented, along with a cautionary perspective on interpretation of data from small sample areas. While membrane fouling reduction is traditionally tackled with a prevention and removal strategy, an alternative “biofilm management” approach was put forward. Although a lot of physical and chemical techniques were presented, delegates also stressed the importance of microbiology for getting the whole picture and the need for a range of carefully selected analytical techniques to do so. This paper summarises the proceedings and discussion at this workshop in September 2012.

Keywords: Membrane fouling; Biofouling; EPS; TEP; Workshop Oxford

1. Introduction

The issue of membrane fouling has drawn the attention of thousands of researchers across the globe. In order to reduce fouling or at least its negative consequences, it is preferable to first develop a fundamental understanding of the problem. For a number of years, the theory of membrane fouling inferred the build-up of discrete particles and molecules on the surface or within the pore structure of the membrane [1]. Whilst this is by no means invalid, a more complex understanding of fouling is evolving due to biofilms, commonly referred to as biofouling in which bacteria cell colonies and associated biological material develop and cover the surface. The adoption of this new concept among the membrane

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