DYNAMIC INTERFACIAL TENSION

Vladimir Hornof

Professor Emeritus, Department of Chemical Engineering, University of Ottawa, P.O. Box 450, Ottawa, Ontario, Canada K1N 6N5. E-mail: hornof@eng.uottawa.ca; Phone: 613 562 5800 Ext. 6104; Fax: 613 562 5172

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Liquid-liquid interfaces are present in many systems of technical and industrial importance. Oil recovery, remediation of oil-contaminated soils and liquid-liquid extraction are perhaps the most well known examples. The behavior of the interface between two immiscible or partially miscible liquids is strongly influenced by the interfacial tension existing between the two phases. In systems composed of two perfectly immiscible phases, the interfacial tension is constant. Many systems of practical interest, however, involve interfacial mass transfer. Often surfactants are added. Chemical reaction occurring at the interface may generate surface-active species, which subsequently become adsorbed at the interface. As a result, the interfacial tension in such systems is no longer a constant (static) property and may become time dependent (transient) or both time and location dependent (dynamic). Local differences in interfacial tension give rise to interfacial tension gradients, which further complicate the overall behavior.

In this presentation, transient and dynamic interfacial tension phenomena, and their influence on system behavior, will be reviewed with reference to recent oil recovery research conducted in the author’s laboratory.