Experimental Investigation of Heat Transfer and Scale Growth Characteristics of Crystallisation Scale in Agitation Tank

Authors : Prasanjit Das, M .M. K. Khan, M. G. Rasul, Jie Wu, I. Youn

Abstract : Crystallisation scale occurs when dissolved minerals precipitate from an aqueous solution. To investigate the crystallisation scale growth of normal solubility salt, a lab-scale agitation tank with and without baffles were used as a benchmark using potassium nitrate as the test fluid. Potassium nitrate (KNO3) solution in this test leads to crystallisation scale on heat transfer surfaces. This experimental investigation has focused on the effect of surface crystallisation of potassium nitrate on the low-temperature heat exchange surfaces on the wall of the agitation tank. The impeller agitation rate affects the scaling rate at the low-temperature agitation wall and it shows a decreasing scaling rate with an increasing agitation rate. It was observed that there was a significant variation of heat transfer coefficients and scaling resistance coefficients with different agitation rate as well as with varying impeller size, tank with and without baffles and solution concentration. **Keywords :** crystallisation, heat transfer coefficient, scale, resistance

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