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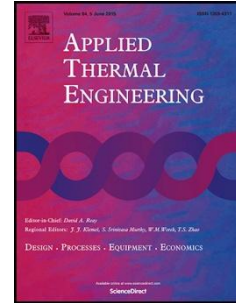
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Characterization of Evaporator Scale of Indian Sugar Industry

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Abstract

Fouling in Multiple Effect Evaporator (MEE) systems is the major unresolved problem encountered in most of the chemical process industries. In order to mitigate fouling from MEE system used in cane sugar industry, it is necessary to understand the type and nature of foulant present in it. In the current paper, authors have tried to present the detailed analysis of deposits present in each effect of a quadruple effect MEE system used in Indian sugar industry. For this purpose, various instrumental analyses were performed and different organic and inorganic compounds and elements present in the deposits were identified. Further, it has also been observed that some elements show a particular trend of deposition from first effect to last effect. This analysis will help industry to select particular mitigation technique to clean deposits.

Keywords: Foulant, Multiple effect evaporators, Scanning Electron Microscope, Cane sugar juice, Fouling mechanism

Introduction

In a MEE system, heat is transferred from vapor chest to the cane sugar juice flowing in tubes. During this process, accumulation of unwanted material on the heat transfer surface takes place which develops a resistance at the interface of heat transfer. The accumulation or deposition of organic and inorganic matter, fibers and other deposits on heat transfer surface is called fouling. According to Taborek et al. (1972) [1] fouling is the major unresolved problem in heat transfer and till now it cannot be mitigated completely. Various investigators [2,3,4,5,6] have studied fouling related costs in industries of different countries and observed that millions of amount is invested in cleaning of equipments due to deposits.

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