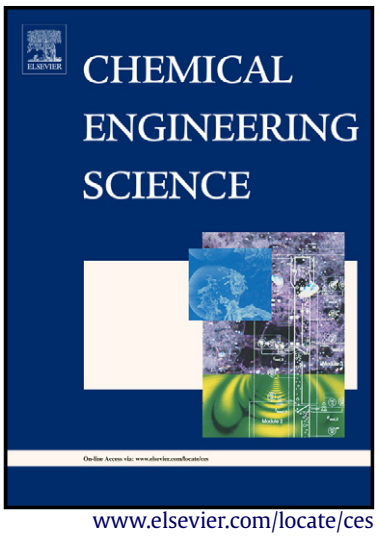

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A New Graphical-Based Approach for Mass Integration and Exchange Network Design

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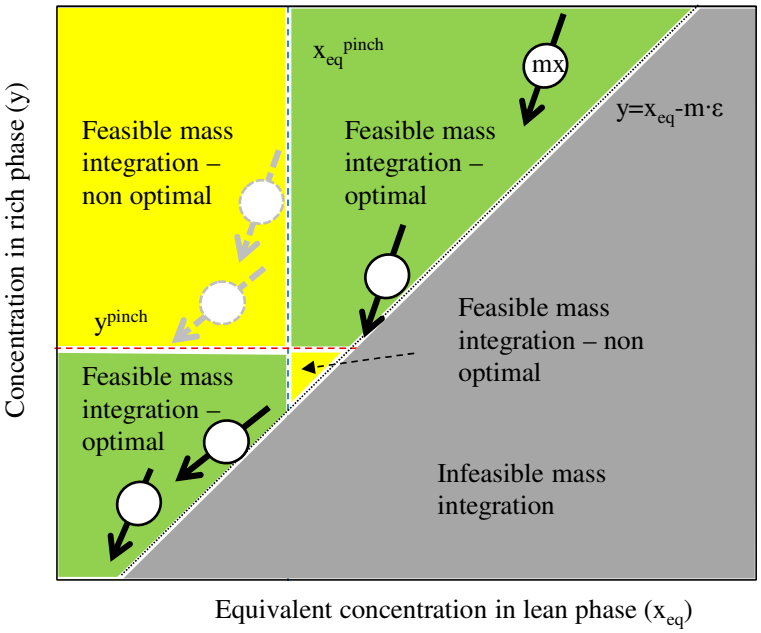
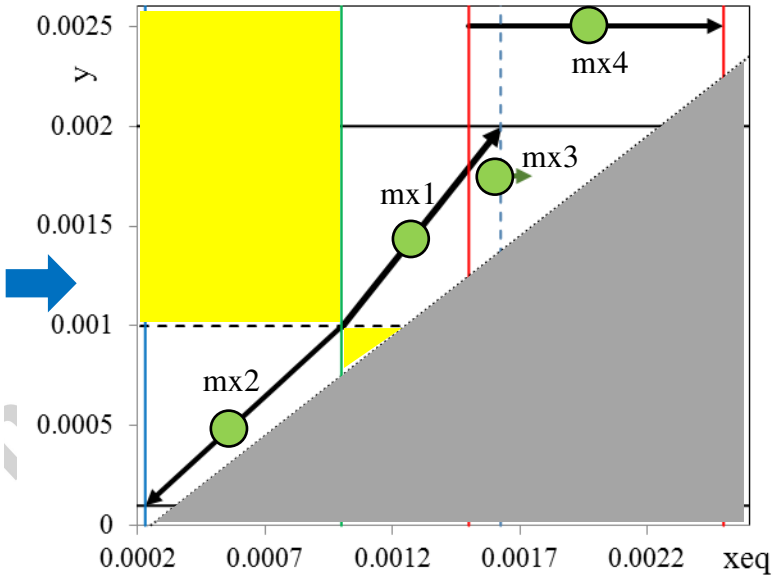


A new graphical representation for mass exchanger networks and feasibility regions for mass integration



A new graphical design for optimum mass integration of benzene recovery in an industrial copolymerisation plant

Abstract

Raw materials are as important as energy to chemical and process industries to provide chemicals essential to modern society and economics. Mass integration, taking place in mass exchange networks or MENs, comes as a significant concept to efficient use of raw materials. Such an integration leads to minimum waste disposal flows and minimum use of external mass separating agents' quantities. Several methods have been proposed to design mass exchange networks, including graphical and numerical solutions. This work develops a new graphical approach for the analysis of mass integration and exchange networks. The new method is graphical-based, and is valid for either existing mass networks or new networks' design. The proposed method incorporates Pinch Analysis principles into a graphical representation of mass integration problem as composition of target materials in rich streams versus the equivalent corresponding compositions in lean streams. New graph representations are used to analyse the performance of existing MENs with respect to targets and to design new networks. Promising modifications to existing MENs can