

Experimental verification of bi-level optimizing control of SMB process along with extended successive RMPC based on Langmuir isotherm

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The SMB(Simulated moving bed) processes have become one of the preferred techniques in the separational fields owing to their advantages of high productivity and purity compared to those of single column preparative chromatography. The main goal of this research can be two-folded. Firstly, lab-scaled SMB experiments are performed to evaluate and verify the suitability of bi-level optimizing control designed to have maximum productivity and minimum solvent consumption which show a pareto's characteristics along with the regulation of product's purity at their set point. Secondly, extended successive linearized RMPC will be proposed in order to guarantee better accuracy of nominal model. Although RMPC developed with respect to the assumption of linear isotherm's behaviors can be applied directly to the plant which generally has a behavior of competitive langmuir isotherm in the case of rich feed conditions, extended RMPC based on successive linearization at every previous trajectories based on Langmuir isotherm shows more model accuracy than the former one.