

확률배치모델에 기반한 연속회분식반응기의 공정분석과 상세 모니터링 기법

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Biological processes have different behavior patterns depending on the influent loads, temperature, the activity of microorganisms and so on. It has been known that a combination of several models can provide a suitable approach in such case. The paper aims at locally monitoring the operation of a batch biological process by the multiple modeling approach. The proposed method consists of four corner stones: (1) multiway principal component analysis (MPCA) to reduce the dimensionality of data and to remove collinearity, (2) the multiple models with a posterior probability for modeling different operating regions, (3) local batch monitoring by the T2 and Q statistics of the specific local model, (4) a new discrimination measure to find a new operating condition. A local monitoring by the multiple models divides the entire operation data into separate regions, model them separately, and then locally supervise them for effective batch monitoring. Results from a pilot-scale 80L sequencing batch reactor (SBR) show that the proposed method has the ability to model the multiple operating conditions, to identify various operating regions and also to find a new operating condition in a pilot-scale SBR reactor.