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过程系统工程

基于物元分析的过程工业报警优化

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摘要 过程工业报警系统设定的报警点多且复杂，给监控生产带来了一定的困难. 结合报警系统的特点和物元分析方法，构造各报警参数的物元模型，定义各报警参数与报警级别的关联函数，提出基于关联函数的权重分配改进，计算各报警参数与报警级别的综合关联度. 在保证安全生产的前提下，根据综合关联度的大小对各报警参数进行优化选择，形成适合过程工业的报警优化方法. 结合精对苯二甲酸溶剂脱水塔报警系统验证了该方法的有效性，基于物元分析的报警优化方法合理地降低了报警系统的报警量和报警频率，为报警管理和操作优化提供了新思路.

关键词 物元分析 报警优化 溶剂脱水塔

分类号

Alarm optimization for process industry based on matter-element analysis

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Abstract

The alarm points given in process industry are massive and complex that may lead to trouble in monitoring the production. In combination with the characteristics of alarm system and matter-element analysis, a matter-element model was established for each alarm parameter, the correlation function was defined between alarm parameters and alarm levels, the weight certainty was improved based on the correlation function, and the comprehensive correlation function between alarm parameters and alarm levels was calculated. Starting from the premise of safety in production,the alarm parameters were optimized and chosen based on the value of comprehensive correlation function. Then the alarm optimization method for process industry was developed. The provided method was applied to the alarm system of purified terephthalic acid (PTA) solvent dehydration tower. The effectiveness of this method was verified by the result of the above case study. It showed that the alarm optimization based on the matter-element analysis reduced the number of alarms and alarm frequency, and provided a new way to alarm management and operation optimization.

Key words matter-element analysis alarm optimization solvent dehydration tower

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