

Solvent extraction process anomaly detection using deep learning autoencoder

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This work conducted an anomaly diagnosis based on a deep learning autoencoder model using time-series multivariate data measured in a solvent extraction process. In order to acquire time-series data in the metal-solvent extraction process, the simulation model of continuous solvent extraction was developed by using the relevant kinetic parameters. In addition, the time series data under normal and 10 fault scenarios were produced by using this model. We got data of pH and metal concentrations in seven stages of the solvent extract process. The data included 37 time-series variables. Using the autoencoder model, one of the unsupervised learning methods of deep learning, the model can detect all of the 10 fault scenarios and alarm faster than usual warning methods. This method is expected to diagnose anomalies and determine the cause of chemical processes with long-time delays and complex relationships.

Keywords: Deep learning, Solvent extraction, Anomaly detection