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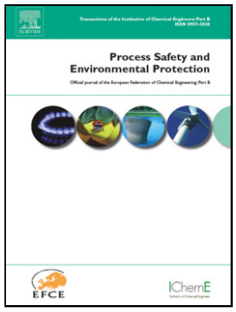

Title: Supervised machine learning techniques in the desulfurization of oil products for environmental protection: a review

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PII: S0957-5820(18)30364-1
DOI: https://doi.org/10.1016/j.psep.2018.08.021
Reference: PSEP 1491

To appear in: *Process Safety and Environment Protection*

Received date: 22-6-2018
Revised date: 4-8-2018
Accepted date: 10-8-2018

Please cite this article as: Al-Jamimi HA, Al-Azani S, Saleh TA, Supervised machine learning techniques in the desulfurization of oil products for environmental protection: a review, *Process Safety and Environmental Protection* (2018), https://doi.org/10.1016/j.psep.2018.08.021

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Supervised machine learning techniques in the desulfurization of oil products for environmental protection: a review

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Abstract

Desulfurization, known as the removal of sulfur from oil, is extremely important in the petroleum processing industry and in the environmental protection. Several oil-upgrading processes such as desulfurization and catalysts such as alumina loaded with molybdenum have been proposed to deal with the problem of removing sulfur-containing compounds from light oil. Thus, several parameters are required to be experimentally optimized which demands a lot of work including reagents. Advanced mathematical tools can be used to optimize the desulfurization process and to study the related factors. The modeling and simulation of the desulfurization process have been proposed in several studies in order to facilitate a better understanding of the process operations. Machine Learning (ML) is regarded as a promising methodological area to perform such optimization and analysis. This review describes the relevant methods for dealing with the applications of ML for desulfurization in oil. Although a good number of research papers have appeared in recent years, the application of ML for desulfurization is still a promising area of research. The review presents an overview of the ML methods and their categories in desulfurization. It discusses and compares the methods that employ ML to optimize the desulfurization process. The review also highlights the findings and possible research directions.

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