Quantitative risk assessment on ammonia based hydrogen refueling station

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As the use of hydrogen as a clean energy increases, ammonia is attracting attention as a hydrogen storage medium. Ammonia has a high hydrogen storage capacity per unit mass and can be stored in a liquid state, so it can be used as a hydrogen storage medium for hydrogen refueling stations. However, due to the high toxicity and reactivity from its physical properties, it is important to evaluate and manage the risks of the process. In this study, process and safety design for ammonia-based hydrogen refueling station was performed. We constructed the process model for dehydrogenation process and the hydrogen filling process, then performed a quantitative risk assessment using heat and mass balance data. Finally, we suggested to design method to mitigate the risk of the given process.