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Geometrical Impaction of Supersonic Nozzle on the Dehumidification Performance During Gas Purification Process: an Experimental Study
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Abstract

The removal process of undesirable non-gaseous particles from ore natural gas is still a challenge due to the absence of reliable equipment that achieve high filtration performance. Supersonic nozzle has recently been introduced as a robust means to meet such demands. However, it continues to be a great need to identify the optimal shape of the supersonic nozzle that possesses capability of separating out particles at maximum efficiency. The present study addresses experimentally the capturing efficiency and performance of the Convergent–Divergent Nozzle at various geometries. It also quantifies the particle separation performance and the pressure recovery factor at various NPRs. The experimental results have shown that triangular shape is the most efficient geometry at NPR of 2. However, conical nozzle performs separation better than the others at relatively low NPRs. In contrast, the pentagonal nozzle is the poorest for all NPRs. In terms of pressure recovery at the exit of the nozzle separation system, although the pentagonal shape recovers about 85% of the inlet gas pressure at moderate NPRs, the conical shape pressure recovery factor reaches to 90% at low NPRs. © 2018, King Fahd University of Petroleum & Minerals.

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