

Gasification of Valine in Supercritical Water

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Amino-acid producing factories generate fermented wastewater which contains a significant amount of amino-acids. In this work, valine as a model for the waste was gasified in supercritical water not only to destroy organic compounds but also to obtain synthesis gas rich in hydrogen. A continuous-flow reactor packed with the 16 wt% Ni/activated charcoal was employed. The effect of temperature ranging from 575 to 725 °C on the extent of gasification and product distribution was investigated at 28 MPa and 12 h⁻¹ LHSV. A sequence of gasification experiments was also performed with activated charcoal and also without catalyst at the same temperatures for comparative evaluation of the catalytic activity. The activity for hydrogen production reactions was enhanced significantly with Ni/activated charcoal catalyst. The Ni/activated charcoal produced lower level of ammonia in the liquid effluents. The catalyst was characterized for elemental composition, surface morphology, and metal dispersion.