Title: Mathematical modeling of gasifying agent effect on the gasification of vacuum residue oil

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Combustion of vacuum residue oils emits considerable amount of air pollutant and particulates. Gasification is environmentally efficient process to convert these heavy oils to synthetic gas (syngas) which can be used widely in downstream processes.

Here, gasification of vacuum residue oil and its conversion to syngas is modeled. For this purpose, first, with comparison between model and experimental results, the validation of model is confirmed. Then, effects of some parameters such as type of gasifying agent, equivalence ratio and amount of steam supplied, are investigated.
According to modeling results, it is observed that with increasing the equivalence ratio (i.e. reactions trend toward the combustion reactions) the amount of hydrogen and carbon monoxide reduce and gasifier temperature increase. With increasing the amount of oxygen in oxidant agent, according to nitrogen reduction, hydrogen and carbon monoxide production increase. In steam-gasification processes, the amount of hydrogen production is higher in comparison with steam free state (oxidant agent gasification), but for doing this kind of gasification, the required energy for gasification reactions must be supplied. Up to syngas downstream application, type and amount of gasifying agent differ. Investigation showed that variation of gasifier pressure has no significant effect on gasification properties.

Biography

Amin Alipour is the current Phd Student in the field of biomaterial Engineering and also he is working in South Pars Gas Company as Process Engineer. He has three other publicaions in certified journals in fields of Process Modeling and Biomaterial.

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