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Kinetic modeling of biomass steam gasification in the bubbling fluidized bed of a dual fluidized bed reactor

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By incorporating reaction kinetics and reactor hydrodynamics, a steady-state two-phase one-dimensional kinetic model for biomass steam gasification in the bubbling fluidized bed gasifier of a dual fluidized bed reactor is developed. The generic two-step kinetic model adopted for biomass pyrolysis allows for predicting tar generation and cracking, as well as predicting pyrolysis products yield and composition based on CHO elemental balances. This model is capable of predicting species concentrations, solids hold-up, temperature, pressure and superficial gas velocity profiles along the gasifier. By performing mass and energy balances over the two interconnected fluidized beds, key operating parameters such as solids circulation rate and additional fuel required for stable operation of the process are approximated. This predictive kinetic model provides an essential tool for designing, evaluating and improving a dual fluidized bed gasifier. The dual fluidized bed gasifier model predictions are compared with experimental measurements from the UBC dual fluidized bed unit.

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Achromatizing textile waste water and purifying it by industrial waste

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Water is our life line that is very important for living organisms. It provides the Earth with the capacity of supporting life. Water is a transparent fluid. It is one of the weirdest compounds known to humans. It is a remarkable solvent, where almost all the elements and compound can dissolve in its powerful molecular structure. Water is the chemical substance with chemical formula H_2O (one molecule of water has two hydrogen atoms covalently bonded to a single oxygen atom). The textile waste water is collected and a sample of 1000 ml waste water is taken to carry out the experiment. In the sample of waste water, we added 10 ml of hydrogen peroxide, which act as a decolorizing agent and pH is maintained at 7 using acid (Sulfuric acid) and base (Sodium hydroxide). 1 gram of steel scrap in a black pan was taken and waste water solution was added to the pan and it was covered by glass slab and kept in the sunlight for 30 minutes. After 30 minutes decolorized of the solution is observed and then the water is stirred at 3000 rpm for 3 minutes so that it is fully decolorized and this water can directly be used for irrigation purpose. This occurs due to the generation of hydroxyl radical (OH) during the iron catalyzed decomposition of hydrogen peroxide in acid medium. After the decolorization of the water it is passed through the industrial waste which is fly ash. Passing the water from fly ash gives pure water which can used for drinking.

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