Catalytic Wet Gasification of Refined Fuels from Municipal Sewage Sludge

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Municipal sewage sludge could have been refined by agglomeration with oil-coal mixtures, and it is possible that agglomerates of sewage sludge with oil-coal mixtures (Sludge-Oil-Coal-Agglomerate: SOCA) are used as a fuel for production of clean energy, e.g. catalytic gasification. Moreover, the SOCA contents relatively low heavy metals and components poisoning catalysts compared with raw materials of coal and sewage sludge. Thus, it is expected that catalytic gasification of the SOCA reduces deactivation of catalysts. SOCA and raw materials such as coal, oil and tar were analyzed for thermal characteristics by a thermal gravity analyzer (TGA). Catalyst screening was performed in a fixed bed catalytic gasifier. It was suggested that CaO is effective in SOCA gasification with low deactivation. In a continuous catalytic gasification, CaO catalyst was fluidized. First, gasification of mixtures of dry sewage sludge and coal was investigated in produced gas composition. In the continuous gasification of SOCA, uitilization of CaO catalyst was compared with that of sand particles in produced gas composition of H_2, CO, NH_3 and HCN.