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Production of Synthesis Gas by Catalytic Partial Oxidation of Tar Derived from Pyrolysis of Spent Malt

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The catalytic activity of Rh/CeO₂/SiO₂ was assessed for the partial oxidation of tar derived from spent malt. This catalyst was developed for the gasification of cedar wood at lower temperatures than conventional methods, such as steam reforming using Ni catalyst and or without catalyst. Partial oxidation of spent malt in the absence of catalyst yielded tar with a carbon based yield almost the same as that from cedar wood. Partial oxidation of the tar from cedar wood pyrolysis over Rh/CeO₂/SiO₂ and Ni catalyst converted the tar almost completely. On the other hand, tar from the pyrolysis of spent malt had lower reactivity than that of cedar wood. Higher temperatures such as 923 K were needed for tar conversion to the similar level to tar from cedar wood even over Rh/CeO₂/SiO₂. The nitrogen content in spent malt was much higher than that in cedar wood. The effect of NH₃ addition on the partial oxidation of cedar wood was investigated. Furthermore, tar derived from cedar wood and spent malt was analyzed by GC-MS. Various nitrogen-containing hydrocarbons were observed in the tar derived from spent malt, although oxygenates were observed in the tar from cedar. Nitrogen-containing tar is only removed with difficulty.

Keywords: [Biomass](#), [Partial oxidation](#), [Tar](#), [Rhodium catalyst](#), [Spent malt](#), [Synthesis gas](#)



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