

Reaction of Glycerol with Tert-Butanol Catalysed by a Solid Acid Catalyst Ranged from Low to High Temperatures

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The reaction of glycerol with tert-butanol on the sulfonated carbon catalyst (HS-R) provides a way to transform glycerol into a value added product to be used as an oxygenated additive to diesel fuels. With a 4:1 molar ratio of tert-butanol to glycerol, a 1:10 weight ratio of catalysts to glycerol, the etherification reaction glycerol with tert-butanol in an autoclave under autogenic pressures were performed over the reaction temperatures ranged from 363 K to 473 K at the reaction time of 18 hours. We found that under the reaction temperature (473 K), a separation of oil phase and water phase of the product mixture can be achieved. The distilled oil phase product of the product mixture can increase the cetane index 50.1 of the pure petroleum diesel to 52.6 of the mixture of a 1:5 volume ratio of the distilled oil phase product to the pure petroleum diesel. Therefore, the distilled oil phase product can be a candidate of an additive for diesels (bio or petroleum).

Keyword: glycerol, tert-butanol, etherification, oxygenated additive, diesel

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