Uji Performa Katalis Ru/CeO2 Nanosphere Dan Pengaruh Penambahan Zn Pada Reaksi Dehidrogenasi Amonia Borana = Assessing the efficiency of the Ru/CeO2 nanosphere catalyst and studying the impact of Zn addition on the ammonia borane dehydrogenation reaction

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Abstrak

Amonia borana (NH3BH3) dapat digunakan sebagai pembawa hidrogen untuk produksi energi hidrogen karena kandungan hidrogennya yang besar yaitu 19,6 wt%. Sintesis katalis Ru/CeO2 dengan variasi morfologi penyangga nanosphere, irreguler, dan nanocubes dilakukan untuk reaksi dehidrogenasi amonia borana. Penambahan Zn sebagai logam kedua pada katalis juga dilakukan. Karakterisasi XRD, XRD, SAA, TEM, dan Spektroskopi Raman dilakukan untuk katalis. Katalis diuji pada reaksi dehidrogenasi amonia boran dengan variasi morfologi, suhu, komposisi, konsentrasi NaOH, dan durabilitasnya. Katalis Ru/CeO2 nanosphere mempunyai aktivitas katalitik terbaik di kondisi NaOH 1 M dengan nilai TOF 748,18 h-1 . Energi aktivasi yang didapatkan dari reaksi adalah 43,06 kJ/mol.

.....Ammonia boranae (NH3BH3) can be used as a hydrogen carrier for hydrogen energy production due to its high hydrogen content, which is 19.6 wt%. The synthesis of Ru/CeO2 catalyst with variations in nanosphere, irregular, and nanocube morphology as supports was carried out for the dehydrogenation reaction of ammonia boranae. The addition of Zn as a second metal in the catalyst was also performed. Characterization tests such as XRD, XRD, SAA, TEM, and Raman spectroscopy were conducted on the catalyst. The catalyst was tested for the dehydrogenation reaction of ammonia boranae with variations in morphology, temperature, composition, NaOH concentration, and durability. The catalytic activity of the Ru/CeO2 nanosphere catalyst is most pronounced when operating under 1 M NaOH conditions, achieving a TOF value of 748.18 h-1 . The activation energy obtained from the reaction is 43.06 kJ/mol.