Sintesis nanokomposit CeO2-CuO menggunakan ekstrak rumput mutiara (oldenlandia corymbosa) dan aktivitas fotokatalitiknya terhadap metilen biru = Synthesis of CeO2 CuO nanocomposites using rumput mutiara (oldenlandia corymbosa) extract and it's photocatalytic activity on methylene blue

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Abstrak

Pada penelitian ini sintesis nanopartikel CeO2, CuO dan nanokomposit CeO2-CuO berhasil dilakukan menggunakan ekstrak rumput mutiara Oldenlandia corymbosa sebagai sumber basa -OH dan capping agent. Nanopartikel dan nanokomposit yang terbentuk selanjutnya dikarakterisasi menggunakan instrumentasi UV-Vis DRS, FTIR, Raman, XRD, PSA, TEM, dan SEM-EDX. Karakterisasi dengan XRD membuktikan bahwa nanopartikel CuO-NPs memiliki struktur kristal monoklinik, CeO2-NPs memiliki struktur kristal FCC, sedangkan nanokomposit CeO2-CuO memiliki puncak khas gabungan kristal keduanya.

Berdasarkan karakterisasi TEM, diketahui bahwa nanokomposit CeO2-CuO memiliki ukuran 10-15 nm dengan bentuk spheric. Karakterisasi dengan UV-Vis DRS membuktikan band gap nanokomposit CeO2-CuO sebesar 2,6 eV. Studi aktivitas fotokatalitik nanokomposit CeO2-CuO diamati dengan degradasi metilen biru menggunakan radiasi sinar tampak. Persentase degradasi untuk nanopartikel CeO2, CuO dan nanokomposit CeO2-CuO masing-masing adalah 18,49; 35,87; dan 59,83.
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In this study, the synthesis of CeO2 NPs, CuO NPs and CeO2 CuO nanocomposites was successfully performed using rumput mutiara Oldenlandia corymbosa extract as a base source OH and capping agent. The synthesized nanoparticles and nanocomposites were characterized with UV Vis DRS, FTIR, Raman, XRD, PSA, TEM and SEM EDX instrumentation. Characterization with XRD proves that CuO NPs nanoparticles have a monoclinic crystal structure, CeO2 NPs have an FCC crystal structure, whereas CeO2 CuO nanocomposites have their own distinctive combined crystal peak.

Based on TEM characterization, it is known that the CeO2 CuO nanocomposites have a size of 10 15 nm with speric shape. Characterization with UV Vis DRS has proven that the CeO2 CuO nanocomposites have band gap energy of 2.6 eV. The study of photocatalytic activity of CeO2 CuO nanocomposites were observed with methylene blue degradation using visible light radiation. Percentages of degradation for CeO2, CuO and CeO2 CuO nanocomposites were 18.49 , 35.87 and 59.83, respectively.