

INTISARI

SINTESIS *CARBON NANOPARTICLE (C-DOT)* BERBAHAN DASAR ARANG AKTIF SERTA POTENSINYA SEBAGAI SENSOR KANDUNGAN LOGAM BERAT

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Telah dilakukan sintesis *Carbon Nanoparticle (C-Dot)* berbahan dasar arang aktif dengan menggunakan metode ablasi laser Nd:YAG. Sebanyak 2 gram arang aktif dilarutkan dalam 100 mL toluena kemudian dilakukan ablasi selama 2 jam dengan panjang gelombang laser 1064 nm, frekuensi 10 Hz, dan energi 70 mJ. Hasil karakterisasi menunjukkan puncak absorpsi pada panjang gelombang 291 nm, intensitas fluoresens 3244,63 a.u pada panjang gelombang 484,99 nm, dan *time-resolved photoluminescence* 5,66 ns. Pada tahapan berikutnya dilakukan transfer fase dari pelarut toluena ke aquades larutan *C-Dot* untuk menjaga biokompatibilitas *C-Dot* berbasis metode surfaktanisasi. Sampel diujikan pada larutan logam berat FeCl_3 dan $\text{Pb}(\text{CH}_3\text{COO})_2$ dengan variasi konsentrasi 0,001 ; 0,01; 0,1; 1; 10; dan 100 mg/mL. Hasil karakterisasi menunjukkan perubahan puncak absorpsi menuju spektrum merah (*red shift*) pada FeCl_3 , dan menuju spektrum biru (*blue shift*) pada $\text{Pb}(\text{CH}_3\text{COO})_2$ seiring kenaikan konsentrasi logam berat. Terjadi penurunan intensitas fluoresensi seiring kenaikan konsentrasi logam berat. Hal ini menunjukkan respon *C-Dot* yang baik untuk mendeteksi keberadaan logam berat sebagai *quencher material* yang merubah sifat optik *C-Dot*.

Kata Kunci : Arang aktif, *C-Dot*, ablasi, *quencher material*, logam berat

ABSTRACT

SYNTHESIS OF ACTIVATED CHARCOAL-BASED *CARBON NANOPARTICLE (C-DOT)* AS WELL AS IT'S POTENTIAL TO DETECT HEAVY METAL CONTENT

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An activated charcoal-based *Carbon Nanoparticle (C-Dot)* has been synthesized by using Nd:YAG's laser ablation method. 2 g of activated charcoal and 100 mL of toluene ablated within 2 hours at wavelength 1064 nm, frequency 10 Hz, and energy 70 mJ. The characterization results of *C-Dot* synthesized showed that absorption's peak was on wavelength 291 nm, fluorescence's intensity 3244,63 a.u at wavelength 484,99 nm, and *time-resolved photoluminescence* 5,66 ns. A surfactantization-based phase transfer from toluene-based solvent to aquades-based solvent was performed to maintain the biocompatibility of *C-Dot*. Sample then reacted with FeCl₃ dan Pb(CH₃COO)₂ solutions with range of concentration variations 0,001 ; 0,01; 0,1; 1; 10; and 100 mg/mL. for determining it's responses on heavy metal presence. The absorption's peak changed over heavy metal's concentration increase; approaching IR spectrum (*red shift*) at FeCl₃, and UV spectrum (*blue shift*) at Pb(CH₃COO)₂. The fluorescence intensity decreased over heavy metal's concentration increase. These results presented well responses of *C-Dot* in the heavy metal presence's detection as a *quencher material* which changing the optical properties of *C-Dot*.

Keywords : activated charcoal, *C-Dot*, ablation, *quencher material*, heavy metal