Sintesa dan penentuan energi pembentukan Cu(1-x)Znx Fe2O4 (0.35 ≤ x ≤ 0,45) dengan teknik flow injection synthesis = Synthesis and determination of the Cu(1-x)Znx Fe2O4 (0.35 ≤ x ≤ 0,45) formation energy use flow injection synthesis technique

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Abstrak

[ABSTRAK
Pembuatan bahan Cu-ZnFerrite dapat dilakukan dengan teknik Flow Injection Synthesis-FIS, dimana proses pembentukan bahan dilakukan secara reaksi kimia basah yang mengh asilkan pengendapan ?yield, dengan bahan baku FeCl2.4H2O, FeCl2.6H2O, CuCl2.2H2O, dan ZnCl2. Teknik FIS merupakan metode ko-presipitasi yang dilakukan secara terstruktur sehingga kecepatan reaksi, temperatur, dan pH bahan baku dapat diatur, direkam dengan skala produksi dapat dikembangkan dalam jumlah yang relatif besar. Fraksi yield merupakan fungsi dari pH larutan dan temperatur reagent yang berada dalam reaktor FIS. Parameter proses seperti; pH, temperatur (T), dan waktu proses(t) dapat direkam dengan memori elektronik SD-Card pH datalogger. Pengolahan data parameter proses pH dapat dilakukan relatif cepat sehingga diperoleh estimasi nilai entalpi dan kinetika pembentukan partikel bahan dengan teori dasar Avrami-Ozawa dan Kissinger. Salah satu macam produk yang diteliti adalah Bahan Cu-ZnFerrite. Karakteristik dasar bahan uji tersebut mampu menghsilkan nilai validitas dan reliabilitas tinggi yang direpresentasikan dalam bentuk nilai kesalahan pada rata rata atom. Dari 6 sampel berbeda tingkat krsalahan pembentuk senyawa Cu-ZnFerrite 0.85% dengan reliabilitas >0.9. Hal ini menunjukkan sistem FIS sebagai sistem alat ukur dan pemrosesan bahan Cu-Znferrite memiliki kemampuan ukur dan proses yang sahih-valid dan konsistensi-reliability, sehingga memungkinkan dapat digunakan untuk estimasi energi pembentukan pembentukan Cu-ZnFerrite dengan formulasi Cu(1-x) ZnxFe2O4 pada rentang x antara 0.35 sampai 0.45. Hasil estimasi nilai entalpi rata rata Cu-ZnFerrite 0.65[kcal/mol]. Secara kinetik bentuk partikel adalah batang berukuran paling besar 1,53 um dengan laju pembentukan 50 [nm/sec]. Uji Karakterisasi Difraksi SinarX, Ukuran partikel-Particle Size Analyser, dan Permagraf memperlihatkan partikel bahan Cu-ZnFerrite mudah dipengaruhi oleh atom yang berada baik pada sisi tetrahedral maupun sisi oktahedral Kristal spinel bahan.;
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ABSTRACT
The manufacture of Cu-ZnFerrite can be done by using the Technical of Flow Injection Synthesis-FIS, where the material forming process carried out by wet chemical reactions that produce the precipitation matter ?yield. The raw materials were; FeCl2.4H2O, FeCl3.6H2O, CuCl3.2H2O, and ZnCl2. The FIS technique developed by major reactor components such as; adiabatic reactor, peristaltic pumps and pH datalogger, where a co-precipitation synthesis method is done in a structured so that the reaction speed, temperature, and pH of the raw material can be arranged, recorded and scale of production can be developed in a relatively large amount. The process parameters such of pH, temperature (T), and the processing time (t) were recorded with an electronic memory SD-Card Datalogger and it can be performed in order to obtain both the enthalpy value and the kinetics of the material formation. The particle kinetic can be analyzed with the basic theory of Avrami-Ozawa and Kissinger. The baseline characteristics of the test material

capable to result of both the instruments validity and reliability parameter values, which are represented in the form of a low error rate on the average atomic-forming compounds Cu-ZnFerrite a rounds 0.85% and reliability value more than 0.9 .The FIS system as a system of measuring and processing of Cu-Znferrite have ability to measure the parameter process as valid and consistency with high-reliability. In the estimation process of the formation energy of formation of Cu-ZnFerrite or as Cu (1-x) ZnxFe2O4 where x in the range of 0:35 to 0:45. the formation enthalpy of the Cu-ZnFerrite is 0.65 [kcal / mol], the particle shape is rod with a 1.53 um size and the growth formation rate is 50 [nm / sec]. The characterization of either X-ray Diffraction, Particle Size Analyser, or Permagraf show the Cu-ZnFerrite materials are easily become unstable particles by atomic both in the tetrahedral or octahedral spinel crystal sides; The manufacture of Cu-ZnFerrite can be done by using the Technical of Flow Injection Synthesis-FIS, where the material forming process carried out by wet chemical reactions that produce the precipitation matter ?yield. The raw materials were; FeCl2.4H2O, FeCl3.6H2O, CuCl3.2H2O, and ZnCl2. The FIS technique developed by major reactor components such as; adiabatic reactor, peristaltic pumps and pH datalogger, where a co-precipitation synthesis method is done in a structured so that the reaction speed, temperature, and pH of the raw material can be arranged, recorded and scale of production can be developed in a relatively large amount. The process parameters such of pH, temperature (T), and the processing time (t) were recorded with an electronic memory SD-Card Datalogger and it can be performed in order to obtain both the enthalpy value and the kinetics of the material formation. The particle kinetic can be analyzed with the basic theory of Avrami-Ozawa and Kissinger. The baseline characteristics of the test material capable to result of both the instruments validity and reliability parameter values, which are represented in the form of a low error rate on the average atomic-forming compounds Cu-ZnFerrite a rounds 0.85% and reliability value more than 0.9 .The FIS system as a system of measuring and processing of Cu-Znferrite have ability to measure the parameter process as valid and consistency with high-reliability. In the estimation process of the formation energy of formation of Cu-ZnFerrite or as Cu (1-x) ZnxFe2O4 where x in the range of 0:35 to 0:45. the formation enthalpy of the Cu-ZnFerrite is 0.65 [kcal / mol], the particle shape is rod with a 1.53 um size and the growth formation rate is 50 [nm / sec]. The characterization of either X-ray Diffraction, Particle Size Analyser, or Permagraf show the Cu-ZnFerrite materials are easily become unstable particles by atomic both in the tetrahedral or octahedral spinel crystal sides, The manufacture of Cu-ZnFerrite can be done by using the Technical of Flow Injection Synthesis-FIS, where the material forming process carried out by wet chemical reactions that produce the precipitation matter –yield. The raw materials were; FeCl2.4H2O, FeCl3.6H2O, CuCl3.2H2O, and ZnCl2. The FIS technique developed by major reactor components such as; adiabatic reactor, peristaltic pumps and pH datalogger, where a co-precipitation synthesis method is done in a structured so that the reaction speed, temperature, and pH of the raw material can be arranged, recorded and scale of production can be developed in a relatively large amount. The process parameters such of pH, temperature (T), and the processing time (t) were recorded with an electronic memory SD-Card Datalogger and it can be performed in order to obtain both the enthalpy value and the kinetics of the material formation. The particle kinetic can be analyzed with the basic theory of Avrami-Ozawa and Kissinger. The baseline characteristics of the test material capable to result of both the instruments validity and reliability parameter values, which are represented in the form of a low error rate on the average atomic-forming compounds Cu-ZnFerrite a rounds 0.85% and reliability value more than 0.9 .The FIS system as a system of measuring and processing of Cu-Znferrite have ability to measure the parameter process as valid and consistency with high-reliability. In the estimation process of the formation

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