Portofoliu de 10 lucrări științifice considerate relevante de către candidat, elaborate în domeniul de doctorat vizat

Număr	*Articole științifice considerate relevante*	*Factor de impact*
1.	**R. Ianoș**, R. Lazău, S. Borcănescu, R. Băbuță, Single-step combustion synthesis of $LaAlO_3$ powders and their sintering behavior. Ceram. Int. 40 (2014) 7561–7565.	2.605
2.	**R. Ianoș**, P. Barvinschi, Solution combustion synthesis of calcium zirconate, $CaZrO_3$, powders. J. Solid State Chem. 183 (2010) 491–496.	2.133
3.	**R. Ianoș**, S. Borcănescu, R. Lazău, Large surface area $ZnAl_2O_4$ powders prepared by a modified combustion technique. Chem. Eng. J. 240 (2014) 260–263.	4.321
4.	**R. Ianoș**, M. Bosca, R. Lazău, Fine tuning of $CoFe_2O_4$ properties prepared by solution combustion synthesis. Ceram. Int. 40 (2014) 10223–10229.	2.605
5.	**R. Ianoș**, Highly sinterable cobalt ferrite particles prepared by a modified solution combustion synthesis. Mater. Lett. 135 (2014) 24–26.	2.489
6.	**R. Ianoș**, A. Tăculescu, C. Păcurariu, I. Lazău, Solution combustion synthesis and characterization of magnetite, Fe_3O_4, nanopowders. J. Amer. Ceram. Soc. 95 (2012) 2236–2240.	2.610
7.	**R. Ianoș**, C. Păcurariu, G. Mihoc, Magnetite/carbon nanocomposites prepared by an innovative combustion synthesis technique – Excellent adsorbent materials. Ceram. Int. 40 (2014) 13649-13657.	2.605
8.	**R. Ianoș**, R. Lazău, R.C. Boruntea, Solution combustion synthesis of bluish-green $BaAl_2O_4$: Eu^{2+}, Dy^{3+} phosphors. Ceram. Int. 41 (2015) 3186–3190.	2.605
9.	**R. Ianoș**, R. Lazău, I. Lazău, C. Păcurariu, Chemical oxidation of residual carbon from $ZnAl_2O_4$ powders prepared by combustion synthesis. J. Eur. Ceram. Soc. 32 (2012) 1605–1611.	2.947
10.	**R. Ianoș**, E.A. Tăculescu (Moacă), C. Păcurariu, D. Niznansky, γ-Fe_2O_3 nanoparticles prepared by combustion synthesis, followed by chemical oxidation of residual carbon with H_2O_2. Mater. Chem. Phys. 148 (2014) 705–711.	2.259


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Single-step combustion synthesis of LaAlO3 powders and their sintering behavior
Robert Ianoș, Radu Lazău, Silvana Borcănescu, Roxana Băbuță
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Abstract
Single-phase LaAlO3 was prepared by a simple combustion synthesis procedure, which relies on using urea and β-alanine fuel mixture, instead of a single fuel. The aqueous solution of La(NO3)3, Al(NO3)3, urea and β-alanine underwent a strong exothermic reaction at 281 °C, thus enabling the formation of single-phase LaAlO3 directly from the combustion reaction—without the need of supplementary annealing. The combustion synthesized LaAlO3 had an average crystallite size of 46 nm and a BET surface area of 3.0 m2/g. The addition of NaCl to the reaction mixture decreased the combustion temperature, promoting an increase of the BET surface area (8.5 m2/g). At the same time the LaAlO3 crystallite size decreased to 36 nm. After sintering at 1500 °C for 5 h, LaAlO3 pellets developed a fine microstructure, reaching 94% of the theoretical density.
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Solution combustion synthesis of calcium zirconate, CaZrO3, powders
Robert Ianoș[a], Paul Barvinschi[b]
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Abstract
Single-phase CaZrO3 powder was prepared by heating at 300 °C an aqueous solution of Ca(NO3)2, ZrO(NO3)2 and β-C3H7NO2 (molar ratio=3:3:4). TG–DTA analysis indicated that an intense exothermic reaction occurred at 255 °C, which lead to the formation of a voluminous white powder. No additional annealing was required, as pure crystalline CaZrO3 resulted directly from the combustion reaction. Although no advanced milling was performed, the specific surface area of the powder was 21.5 m2/g. The average crystallite size of CaZrO3 was 23.9 nm. After sintering in air at 1400 °C for 2 h, the pellets – shaped by uniaxial pressing at 200 MPa – reached 95% of the theoretical density, had no open pores and were slightly translucent.
Graphical abstract
Single-phase CaZrO3 powder was prepared by low-temperature combustion synthesis. The resulting powder had a BET area of 21.5 m2/g. After sintering at 1400 °C for 2 h 95% of the theoretical density was
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Volume 240, 15 March 2014, Pages 260–263
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Large surface area $ZnAl_2O_4$ powders prepared by a modified combustion technique
Robert Ianoș, Silvana Borcănescu, Radu Lazău
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Highlights
• Large surface area $ZnAl_2O_4$ powder was prepared using a new combustion technique.
• Basically, this new technique relies on using zinc acetate instead of zinc nitrate.
• The nanocrystalline (6 nm) $ZnAl_2O_4$ powder had a specific surface area of 127 m^2/g.
• The addition of NH_4NO_3 increased even more the specific surface area to 201 m^2/g.
• At the same time, the average crystallite size of $ZnAl_2O_4$ decreased to 2 nm.
Abstract
$ZnAl_2O_4$ powders with large surface area have been prepared using an original combustion technique which relies on using zinc acetate instead of zinc nitrate. Properties of the resulted $ZnAl_2O_4$ powders were discussed in relation to the synthesis conditions, standard enthalpy of reaction and the total amount of
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Fine tuning of $CoFe_2O_4$ properties prepared by solution combustion synthesis
Robert Ianoș, Marian Bosca, Radu Lazău
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Abstract
Single phase $CoFe_2O_4$ powders were prepared by solution combustion synthesis using β-alanine as fuel. By adding to the reaction mixture various amounts of oxalic acid, which act as a retarding agent and pore generator, properties of $CoFe_2O_4$ powders can be properly adjusted. Depending on the amount of oxalic acid, the average crystallite size of $CoFe_2O_4$ ranges between 13 and 41 nm, whilst the specific surface area varies between 1.8 and 34.4 m^2/g. The combustion synthesized $CoFe_2O_4$ powders exhibit a hard ferimagnetic behavior. The $CoFe_2O_4$ coercivity varies between 71.8 and 126.0 kA/m and the saturation magnetization ranges between 53.0 and 70.6 emu/g. After uniaxial pressing and sintering at 1400 °C for 4 h, the pellets reached relative densities up to 90% of the $CoFe_2O_4$ theoretical density.
Keywords
A. Powders: chemical preparation; A. Sintering; C. Magnetic properties; D. Ferrites; Combustion
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Highly sinterable cobalt ferrite particles prepared by a modified solution combustion synthesis
Robert Ianoș
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Highlights
• Highly sinterable $CoFe_2O_4$ particles were prepared by a modified combustion technique.
• The $CoFe_2O_4$ powder had a BET surface area of 44 m^2/g and crystallites of 11 nm.
• $CoFe_2O_4$ had a saturation magnetization of 38.9 Am^2/kg and a coercivity of 74.2 kA/m.
• After sintering at 1100 °C/2 h, $CoFe_2O_4$ pellets reached 99% of the theoretical density.
• The sintering temperature of $CoFe_2O_4$ was decreased by approximately 300 °C.
Abstract
Highly sinterable $CoFe_2O_4$ particles were prepared by a modified solution combustion synthesis, starting from a stoichiometric mixture of cobalt acetate (instead of cobalt nitrate), iron nitrate and 5-aminotetrazole. The resulted cobalt ferrite powder had large surface area (44 m^2/g), small crystallite size (11 nm) and a
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Solution Combustion Synthesis and Characterization of Magnetite, Fe3O4, Nanopowders
Robert Ianoş[1,*], Alina Tăculescu[1,2], Cornelia Păcurariu[1] and Ioan Lazău[1]
Article first published online: 20 MAR 2012
DOI: 10.1111/j.1551-2916.2012.05159.x
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Combustion synthesis of Fe3O4 and properties of the resulted powders have been discussed in relation to reaction atmosphere (in air/in the absence of air) and used fuel (sucrose, citric acid and glucose). Conducting the combustion reactions in air caused the rapid oxidation of Fe2+ to Fe3+ under the influence of the atmospheric oxygen; therefore the final reaction product was a mixture of α-Fe2O3 and γ-Fe2O3. In order to avoid the oxidation of Fe2+ to Fe3+ a simple but efficient solution has been suggested: combustion reactions were carried out in a round bottom flask and the evolving gases were bubbled in a beaker filled with water. This solution allowed the preparation of Fe3O4 nanopowders, with crystallite size varying from 10 nm (glucose) to 18 nm (citric acid). Depending on the used fuel, the specific surface area of the magnetite powders varied between 56 m2/g (citric acid) and 106 m2/g (glucose). The saturation magnetization of Fe3O4 powders prepared in the absence of air ranged between 55.3 emu/g (glucose) and 59.4 emu/g (sucrose).
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Magnetite/carbon nanocomposites prepared by an innovative combustion synthesis technique—Excellent adsorbent materials
Robert Ianoş, Cornelia Păcurariu, Georgeta Mihoc
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Abstract
Magnetite nanoparticles embedded within a matrix of activated carbon were prepared for the first time using a simple and effective combustion synthesis technique. The resulting nanocomposites had a magnetite/carbon ratio varying between 1/1 and 1/10 and exhibited a ferrimagnetic behavior. As the magnetite/carbon ratio decreased from 1/1 to 1/10, the BET surface area increased from 360 m2/g to 814 m2/g and the saturation magnetization decreased from 34.1 emu/g to 7.8 emu/g. The removal efficiency of phenol and p-chlorophenol increased as the magnetite/carbon ratio decreased. Using an adsorbent mass of 2 g/L, magnetite/carbon nanocomposites showed a removal efficiency ranging from 89% to 98% for p-chlorophenol. For the same adsorbent mass, the removal efficiency of phenol varied between 59% and 91%. The experimental data for phenol and p-chlorophenol adsorption on magnetite/carbon nanocomposites were best fitted by the Sips isotherm and showed a significant increase of the maximum adsorption capacity with the increase of the carbon content. The unique combination of enhanced adsorption capacity, excellent separation capability and the short time span for reaching
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Solution combustion synthesis of bluish-green $BaAl_2O_4$: Eu^{2+}, Dy^{3+} phosphors
Robert Ianoș, Radu Lazău, Renato Cristian Boruntea
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Abstract
Bluish-green phosphors based on Eu and Dy-doped $BaAl_2O_4$ were prepared by solution combustion synthesis, without any additional annealing step, with a view to obtain high intensity of the emitted light and long afterglow. The mean crystallite size of the combustion-synthesized samples varied between 72 and 82 nm and the BET surface area was around 1.4 m^2/g. The emission spectra of the obtained samples present a single band with a maximum at 499 nm. Increasing the Eu^{2+} proportion in the samples leads to a slight increase of the emission intensity, whilst increasing the Dy^{3+}/Eu^{2+} ratio from 0/1 to 3/1 contributes to a sharp increase of the emission band intensity. The samples containing Dy^{3+} show significantly improved afterglow as compared to the sample doped only with Eu^{2+} and the wavelength of the emitted radiation remains the same. Supplementary annealing (air atmosphere) of the samples obtained from the combustion reaction was found to lead to a deterioration of the optical properties, as a consequence of reducing the concentration of structural defects.
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Volume 32, Issue 8, July 2012, Pages 1605–1611
Chemical oxidation of residual carbon from $ZnAl_2O_4$ powders prepared by combustion synthesis
Robert Ianoș, Radu Lazău, Ioan Lazău, Cornelia Păcurariu
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Abstract
The removal of carbon residue from $ZnAl_2O_4$ nanopowders by annealing at 500–800 °C leads to a decrease of specific surface area from 228.1 m^2/g to 47.6 m^2/g. At the same time, the average crystallite size increased from 5.1 nm to 14.9 nm. In order to overcome these drawbacks, a new solution for removing the carbon residue has been suggested: chemical oxidation using hydrogen peroxide. In terms of carbon removal, a H_2O_2 treatment for 8 h at 107 °C proved to be equivalent to a heat treatment of 1 h at 600 °C. The benefits of chemical oxidation over thermal oxidation were obvious. The specific surface area was much larger (188.1 m^2/g) in the case of the powder treated with H_2O_2. The average crystallite size (5.8 nm) of $ZnAl_2O_4$ powder treated with H_2O_2 was smaller than the crystallite size (8.2 nm) of the $ZnAl_2O_4$ powder annealed at 600 °C.
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γ-Fe2O3 nanoparticles prepared by combustion synthesis, followed by chemical oxidation of residual carbon with H2O2
Robert Ianoș[a], Elena-Alina Tăculescu (Moacă)[b], Cornelia Păcurariu[a], Daniel Niznansky[c]
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Highlights
• A mixture of γ-Fe2O3 and residual carbon was prepared by combustion synthesis.
• After the H2O2 treatment, the carbon content decreased from 32.7 to 0.4%.
• At the same time the specific surface area of γ-Fe2O3 increased from 72.6 to 149.0 m2 g−1.
• γ-Fe2O3 nanoparticles had a spherical shape and an average crystallite size of 5 nm.
• The superparamagnetic γ-Fe2O3 powder had a saturation magnetization of 41.5 emu g−1.
Abstract
The combustion reaction product between iron nitrate and glucose is a black powder containing nanocrystalline γ-Fe2O3 impurified with residual carbon. After the H2O2 treatment, the carbon residue is removed, so that the carbon content decreases from 32.7% to 0.4%, and the color of the sample changes
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