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FABRICACIÓN DEL PIGMENTO CERÁMICO $ZnCr_2O_4$ TIPO ESPINELA POR MÉTODOS NO CONVENCIONALES

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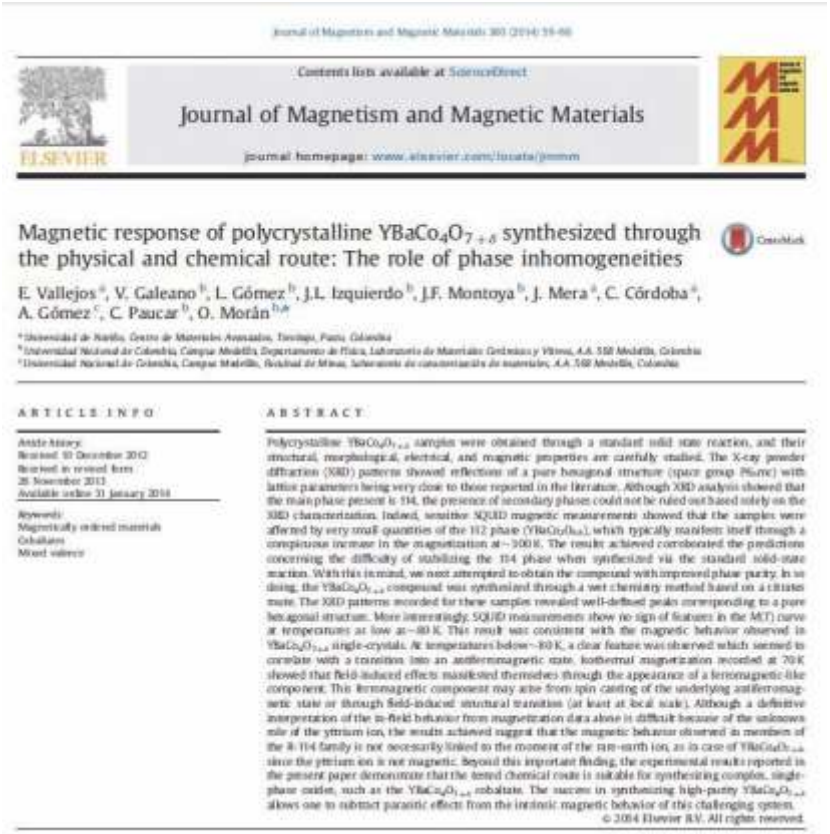
RESUMEN

En este trabajo se sintetizó el pigmento cerámico con estructura espinela $ZnCr_2O_4$ por los métodos no convencionales de autocombustión, coprecipitación asistida por ultrasonido, reacción en micelas normales y molienda de alta energía. Los pigmentos obtenidos se caracterizaron por Difracción de Rayos X (DRX), con el fin de observar la formación de la estructura esperada y Colorimetría CIEL*a*b* para determinar las coordenadas colorimétricas. El objetivo de este trabajo fue comparar cuatro métodos alternativos y determinar cuál de estos métodos brindaba mejores resultados en cuanto a la estructura cristalina, (espinela) y las coordenadas de color, teniendo unas condiciones de tratamiento térmico inferiores a las que se utilizan tradicionalmente que son superiores a los 1100 °C. Los resultados mostraron que por las cuatro rutas se puede obtener este pigmento cerámico con la estructura cristalina deseada a temperaturas inferiores a los 700 °C, además de obtener unas tonalidades similares a la cromita de zinc utilizada empleada en la industria cerámica, las cuales varían de a verde a verde-grisáceo.

Anexo 53. Publicación del docente Juan Fernando Montoya Carvajal en la Revista Colombiana de Materiales, No. 5, 2014. p.284-289



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Magnetic response of polycrystalline $YBaCo_4O_{7+\delta}$ synthesized through the physical and chemical route: The role of phase inhomogeneities

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ABSTRACT

Polycrystalline $YBaCo_4O_{7+\delta}$ samples were obtained through a standard solid state reaction, and their structural, morphological, electrical, and magnetic properties are carefully studied. The X-ray powder diffraction (XRD) patterns showed reflections of a pure hexagonal structure (space group $P6_3mc$) with lattice parameters being very close to those reported in the literature. Although XRD analysis showed that the main phase present is 114, the presence of secondary phases could not be ruled out based solely on the XRD characterization. Indeed, sensitive SQUID magnetic measurements showed that the samples were affected by very small quantities of the 112 phase ($YBaCo_2O_{5+\delta}$), which typically manifests itself through a conspicuous increase in the magnetization at ~300 K. The results achieved corroborated the predictions concerning the difficulty of stabilizing the 114 phase when synthesized via the standard solid-state reaction. With this in mind, we next attempted to obtain the compound with improved phase purity. In so doing, the $YBaCo_4O_{7+\delta}$ compound was synthesized through a wet chemistry method based on a citrates route. The XRD patterns recorded for these samples revealed well-defined peaks corresponding to a pure hexagonal structure. More interestingly, SQUID measurements show no sign of features in the MCT curve at temperatures as low as ~80 K. This result was consistent with the magnetic behavior observed in $YBaCo_4O_{7+\delta}$ single-crystals. At temperatures below ~80 K, a clear feature was observed which seemed to correlate with a transition into an antiferromagnetic state. Isothermal magnetization recorded at 70 K showed that field-induced effects manifested themselves through the appearance of a ferromagnetic-like component. This ferromagnetic component may arise from spin canting of the underlying antiferromagnetic state or through field-induced structural transition (at least at local scale). Although a definitive interpretation of the in-field behavior from magnetization data alone is difficult because of the unknown role of the yttrium ion, the results achieved suggest that the magnetic behavior observed in members of the R-114 family is not necessarily linked to the moment of the rare-earth ion, as in case of $YBaCo_4O_{7+\delta}$ since the yttrium ion is not magnetic. Beyond this important finding, the experimental results reported in the present paper demonstrate that the tested chemical route is suitable for synthesizing complex, single-phase oxides, such as the $YBaCo_4O_{7+\delta}$ cobaltate. The success in synthesizing high-purity $YBaCo_4O_{7+\delta}$ allows one to subtract parasitic effects from the intrinsic magnetic behavior of this challenging system.

Anexo 54. Publicación del docente Juan Fernando Montoya en el Journal of Magnetism and Magnetic Materials, Vol. 360, 2014.

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APLICACIÓN DEL MODELO DE COLOR KUBELKA - MUNK EN ESMALTES DE CERÁMICA TRADICIONAL

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RESUMEN

El objetivo de este trabajo consistió en aplicar del modelo de Kubelka Munk para la predicción de color en esmaltes utilizados en decoración de loza cerámica. El modelo relaciona los coeficientes de absorción y de dispersión de reflectancia difusa esperados para una mezcla de tres pigmentos cerámicos en el espectro visible con las respectivas concentraciones de la composición del esmalte, con lo cual es posible predecir un tono determinado. Se empleó la espectrofotometría visible con el fin de obtener los coeficientes de absorción y dispersión de los pigmentos elegidos sobre sustratos cerámicos para locería, y también para los espectros de reflectancia difusa de las mezclas elegidas para los esmaltes calcinados, los resultados obtenidos mostraron una buena predicción en algunas regiones del espectro visible, concluyéndose que el modelo podría utilizarse para el control de calidad de los productos fabricados en la industria cerámica.

Palabras clave: Color, Kubelka Munk, Esmalte cerámico, Pigmento cerámico, Medición de color.

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APPLICATION OF THE KUBELKA - MUNK COLOR MODEL IN ENAMEL OF TRADITIONAL POTTERY

ABSTRACT

The objective of this work is to apply the Kubelka Munk model for predicting color glazes used in ceramic pottery decoration. The model relates the absorption coefficients of scattering and diffuse reflectance expected for a mixture of three ceramic pigments in the respective concentrations of the composition of the enamel, Which predict a certain tone. It was used visible spectrophotometry to obtain the absorption and scattering coefficients of pigments chosen on ceramic substrates for their use in pottery, and also for the diffuse reflectance spectra of mixtures chosen for enamels calcined, the results showed a good prediction in some regions of the visible spectrum, concluding that the model could be used for quality control of products manufactured in the ceramic industry.

Keywords: *Color, Kubleka Munk, Ceramic enamel, Ceramic pigment, Color measurement.*

Anexo 55. Publicación del docente Juan Fernando Montoya en Revista Politécnia Vol. 10, No. 18, 2014.

Food and Nutrition Sciences, 2014, 5, 671-682
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Scientific Research

Microencapsulation of Banana Passion Fruit (*Passiflora tripartita Var. Mollissima*): A New Alternative as a Natural Additive as Antioxidant

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Received 20 October 2013; revised 20 November 2013; accepted 27 November 2013

Abstract

Banana passion fruit (*P. tripartita var. Mollissima*) is one of the most promising tropical fruits giving its antioxidant activity (AOA) to replace synthetic additives. Despite this property, there are no studies about the metabolites responsible for its biological function or proposals for the application of technologies, such as microencapsulation by spray drying, to improve its properties and ease its incorporation in several food matrices. The aim of this study is to microencapsulate the pulp of banana passion fruit with several mixtures of encapsulants and identify which one of these mixtures is better to preserve its AOA. The antioxidant activity values for the banana passion fruit pulp were as follows: DPPH: 6630.2 ± 91 μMtrolox/100g; ABTS: 18764.3 ± 270.4 μMtrolox/100g; FRAP: 1703.6± 938.2 mgAA/100g. ORAC: 8105.4 ± 424.2 μmol TEAC/100g of sample; Total phenols: 8862.2 ± 451.4 gallic ac. mg/100g. The concentrations of the bioactive compounds expressed in mg of gallic acid per 100 g of the pulp on a dry base were 13.9 ± 0.004; 5.9 ± 0.001 and 126.3 ± 0.004 for caffeic, p-coumaric and ferulic acids, respectively. The best shelf-life followed by ABTS in eight assays was between 28.8 and 31.5 weeks using maltodextrin and modified starch, MD:MS (1/4:3/4) and MD:MS (0:1), respectively. In conclusion, ABTS is the best method to measure the AOA in banana passion fruit because it correlated with the phenolic compounds better than DPPH and FRAP methods. Additionally, two options were found to protect the AOA and to extent the shelf-life of the passion fruit by spray-drying, with mixtures of encapsulants widely used in the food industry.

Anexo 56. Publiacación de los docente Leonidas de Jesús Millán Cardona, Ana María Restrepo Duque, Luz María Alzate Tamayo y Maritza Andrea Gil Garzón en la revista Food and Nutrition Sciences, No.5, 2014.

International Journal of Biodiversity Science, Ecosystem Services & Management, 2014
http://dx.doi.org/10.1080/21513732.2014.973909

Taylor & Francis

Carbon sequestration in different wetland plant communities in the Big Cypress Swamp region of southwest Florida

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(*Submitted 16 February 2014; accepted 3 October 2014; edited by Blanca Bernal*)

Wetlands offer many ecosystem services, including the long-term sequestering of carbon (C) in soil. Here we present a study of C sequestration rates in a relatively undisturbed wetland landscape of southwest Florida. Accordingly, carbon sequestration was determined in four wetland plant communities and an adjacent hydric pine flatwood community that represent a gradient of inundation extent. Going from the wettest to the driest, communities were designated as: deep slough, bald cypress (*Taxodium distichum*), wet prairie and pond cypress (*Taxodium distichum* var. *imbricarium*). An adjacent hydric pine flatwood community was also included in the study as a reference upland site. Three soil cores were collected from each of these communities and were analyzed for total C content. Core samples were also analyzed for ^{137}Cs and ^{210}Pb activity to estimate accretion rates. C sequestration rates (g-C m^{-2} yr^{-1}) were the highest in the deep slough (98 ± 9) and bald cypress (98 ± 5) followed by the pond cypress (64 ± 7), wet prairie (39 ± 1) and pine flatwood (22 ± 5). These results suggest that impediment of decomposition by anaerobic conditions caused by prolonged wet cycles, may not account for all the variability in C sequestration rates observed in this subtropical setting. Instead, this variability could also be attributed to other factors like the quantity and chemical composition of the organic material reaching the soil. When methane emissions are taken into account, cypress-dominated (bald and pond cypress) and the deep slough communities act as net carbon sinks.

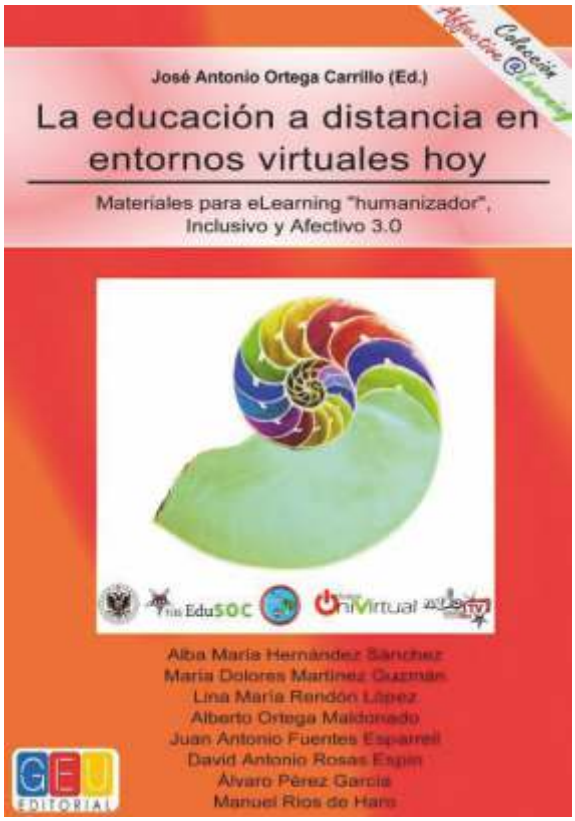
Keywords: carbon sequestration; subtropical wetland; cypress swamp; Everglades; climate regulation; *Taxodium distichum*

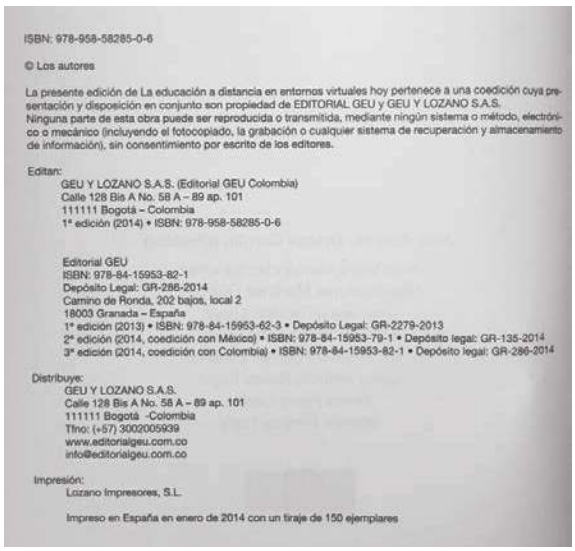
Introduction

Climate regulation through carbon (C) sequestration in wetlands soils may be one of the most important ecosystem services of wetlands in the long term. Carbon is sequestered in wetlands when C inputs (productivity and/or sedimentation) surpasses C outputs (decomposition and C exports) and the remaining organic material, mostly senesced plant material, is accumulated in the wetland's anaerobic sediment layer as a mat of partially decayed organic material, or peat. A fraction of this organic matter may also be incorporated into the mineral fraction of the soil as soil organic C. Globally, it is estimated that 455–700 Pg-C (1 Pg = 10^{15} g) of carbon in organic form is stored in wetlands (Mitsch & Gosselink 2015). By comparison, Lal (2008) estimates that there is 1550 Pg-C stored in the earth's soil organic C pool. This pool includes various forms of organic C, from highly active humus to relatively inert charcoal (Lal 2008). Considering that wetlands occupy only 5–8% of the terrestrial land surface (Mitsch & Gosselink 2015), these global estimates rank them as the terrestrial ecosystems with the highest C density (Kayranli et al. 2010), leading scientists from different disciplines to emphasize the key role that wetland ecosystems may play in the Earth's radiative forcing despite their relatively low percent coverage of the terrestrial world (Whiting & Chanton 2001; Frolking et al. 2006; Page et al. 2011; Mitsch et al. 2013).

Values for C fluxes in wetlands, however, are far from definitive (Roulet 2000). For instance, early estimates of C sequestration rates for North America (52.7 Tg-C yr^{-1}) and the world (137 Tg-C yr^{-1}) had an uncertainty of more than 100% according to Bridgham et al. (2006). More recently, Mitsch et al. (2013) revised this number and after including a revised area for tropical wetlands and their sequestration rates, they estimated that the worldwide sequestration may be around 830 Tg-C yr^{-1}. Much of our current knowledge of wetlands as carbon sources and sinks comes from extensively studied northern peatlands (Gorham 1991; Maltby & Immirzi 1993). In general, wetlands in boreal and subarctic biomes experience low temperatures that are partially responsible for inhibit organic matter decomposition and also limit productivity (Clymo 1984; Roulet et al. 2007). In the case of wetlands in warm subtropical and tropical climates, this temperature effect seems to be more complex and less understood. On the one hand, wetlands are generally more productive in lower latitudes. On the other hand, higher temperatures in these regions could lead to a rate of decomposition that exceeds that of productivity (Franzluebbers et al. 2001; Mitsch et al. 2010).

Anexo 57. Publicación del docente Jorge Andrés Villa Betancur
en International Journal of Biodiversity Science, Ecosystem Services & Management.





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Anexo 58. Capítulo de libro publicado por la docente Lina María Rendón López

Gestión Estratégica de la
Propiedad Intelectual
Universidad - Empresa

Capítulo 7

Manejo de información confidencial

Autores
Hugo Daniel González Hernández[1]
Juan Ignacio Granados Aristizábal[2]

Experto asesor de contenido
Juan Francisco Ortega Díaz[3]

7.1 Introducción

Como se ha demostrado a lo largo de la presente Guía, los proyectos de I+D generan nuevos conocimientos aplicados a la industria o al sector servicios, encaminados a brindar soluciones o mejorar la forma en que se abordan los problemas técnicos de cualquier sector económico. La calidad, pertinencia y efectividad de los resultados obtenidos, aunados a la forma en que se gestionan, jurídica, administrativa y comercialmente, inciden directamente en que los mismos se clasifiquen como "innovadores".

Buena parte de los resultados obtenidos en este tipo de proyectos pueden ser protegidos mediante diversas figuras jurídicas establecidas en las legislaciones de Propiedad Intelectual (PI) de cada país. En ocasiones, el secreto industrial puede reportar importantes ventajas al momento de iniciar procesos de protección, explotación y transferencia tecnológica toda vez que, a partir de su adecuada implementación, se permite documentar el conocimiento generado, definir el alcance y

1 Abogado de la Universidad de Antioquia, especialista en Derecho de los Negocios de la Universidad Externado de Colombia, con formación y experiencia en Gestión estratégica de Propiedad Intelectual. Ha sido asesor de programas gubernamentales de creación de empresas de base tecnológica en Colombia y de la Organización de Estados Americanos (OEA). Se desempeñó como Asesor Jurídico de la Dirección de Gestión Tecnológica de la Universidad de Antioquia. Participó como gestor jurídico de la primera spin-off universitaria surgida en la Universidad de Antioquia.

2 Abogado de la Universidad de Medellín. Magíster en Derecho Comercial de la Universidad Externado de Colombia. Docente de la Corporación Universitaria Lasallista. Abogado consultor en temas de Propiedad Intelectual.

3 Doctor en Derecho por la Universidad de Salamanca y autor de libros y de más de treinta artículos científicos en revistas internacionales. Profesor de Planta de la Universidad de los Andes y Director del Grupo de Estudios de Derecho de la Competencia y de la Propiedad Intelectual.

Anexo 59. Capítulo de libro publicado por el docente Juan Ignacio Granados Aristizábal


TMS2014

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About this Abstract

Meeting	2014 TMS Annual Meeting & Exhibition
Symposium	Nanoparticulate Materials: Production, Consolidation and Characterization
Presentation Title	Synthesis of Ceramic Nanopigments
Author(s)	Oscar Jaime Restrepo, Edgar Andres Chavarriaga, Camilo Restrepo, Juan Fernando Montoya
On-Site Speaker (Planned)	Oscar Jaime Restrepo
Abstract Scope	This paper presents the results of the manufacturing ceramic nanopigments with spinel structures ZnxCo(1 - x)Cr2O4 with stoichiometry x = 0, x = 0.5 and x = 1 using the method of Combustion Solution-synthesis. This method become an attractive alternative by obtaining nanopigments to lower temperatures that other synthesis reducing manufacturing costs, lower fuel consumption, less wear on equipment and other environmental and economic implications. Also it is possible to have control over features such as stoichiometry, morphology of the products, reaction times and purity of the phase obtained. The products obtained by this route were characterized using different techniques such as: x-ray diffraction (XRD), scanning electron microscopy (SEM), UV-VIS spectrophotometry and colorimetry (CIEL*a*b*. Particle size of the nanoparticles obtained by the spinel structures was less 130nm.
Proceedings Inclusion?	Planned: Publication Outside of TMS

OTHER PAPERS PLANNED FOR THIS SYMPOSIUM

Anexo 60. Capítulo memorias publicado por el docente Juan Fernando Montoya Carvajal


TMS2014

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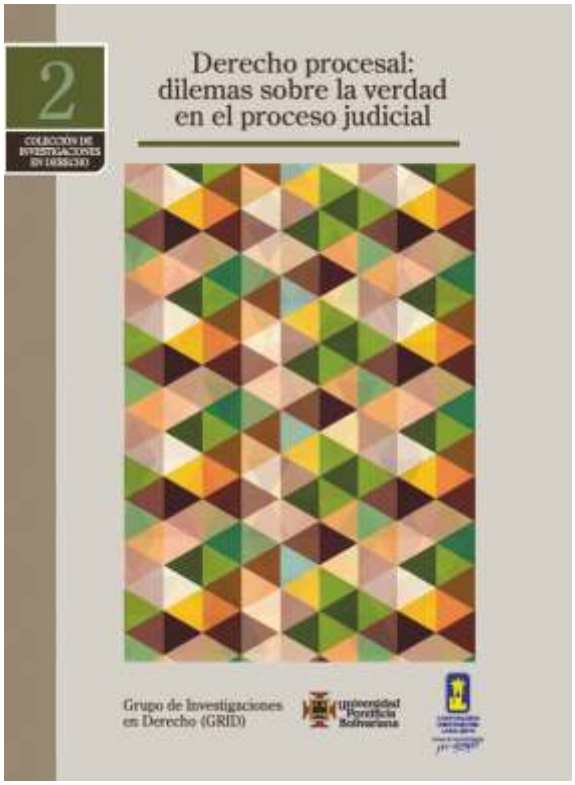
About this Abstract

Meeting	2014 TMS Annual Meeting & Exhibition
Symposium	2014 Functional Nanomaterials: Synthesis, Properties and Applications
Presentation Title	Optical and Magnetical Properties of FeCr2O4 Nanopigments with Spinel Type Structure
Author(s)	Oscar Jaime Restrepo, Juan Fernando Montoya, Edgar Andres Chavarriaga
On-Site Speaker (Planned)	Oscar Jaime Restrepo
Abstract Scope	Through solid state reactions at high temperatures, using iron and chromium oxides (Cr2O3 and Fe3O4) in fixed proportions as precursors, was synthesized the nanopigment FeCr2O4 with spinel type structure. For different temperatures synthesis was conducted a characterization of the material obtained through X-ray diffraction (XRD), spectroscopy UV-VIS-NIR, thermal analysis (DTA/TGA), scanning electron microscopy (SEM), UV-VIS spectrophotometry and colorimetry CIEL*a*b* and magnetic susceptibility. Particle size of the nanoparticles obtained by the spinel structures was less 100nm.The changes in the reflectance spectra are related to the identified phases, the crystallinity degree, the spatial planning of cations and the magnetic behavior obtained.
Proceedings Inclusion?	Planned: a print only volume

OTHER PAPERS PLANNED FOR THIS SYMPOSIUM

Anexo 61. Capítulo en memorias publicado por el docente Juan Fernando Montoya Carvajal



La conciliación. Su verdad como consenso en Colombia

Conciliation. Its truth as consensus in Colombia

Adriana Patricia Arboleda López[1]
Corporación Universitaria Lasallista
Colombia

Resumen

La conciliación en derecho constituye una herramienta primordial para la terminación consensuada de los conflictos. Su finalidad es lograr paz entre las partes con la resolución

1 Doctora en Derecho Procesal Contemporáneo (2015). Magíster en Derecho Procesal de la Universidad de Medellín (2008), especialista en Derecho Administrativo (2000). Abogada conciliadora (2012). Docente Directora del Consultorio Jurídico y del Centro de Conciliación Lasallista Juan Rafael Cárdenas Gutiérrez del Programa de Derecho de la Facultad de Ciencias Sociales y Educación de la Corporación Universitaria Lasallista. Docente investigadora adscrito del grupo de investigación en derecho GRIDE de la Corporación Universitaria Lasallista. Miembro de la Red de Derecho Procesal. Capítulo resultado de investigación en tesis doctoral denominada "La Conciliación, como instrumento de solución integral a los conflictos de familia" desarrollado en convenio marco entre la Corporación Universitaria Lasallista y la Universidad de Medellín, realizado entre los años 2010 y 2015, el cual fue dirigido por la Dra. Diana María Ramírez Carvajal. Financiado por el Fondo para el Desarrollo Investigativo Lasallista. E-mail: arboleda@lasallista.edu.co

Anexo 62. Capítulo de libro publicado por la docente Adriana Patricia Arboleda

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