

NANOSCIENCE AND NANOTECHNOLOGY PROGRAM

Juan Carlos Rendón-Angeles, Ph D



PhD Rendón has over 17 years' graduate experience as a researcher and an academic in hydrothermal processing, inorganic compound powder processing and particle growth under hydrothermal solutions. He graduated from the University College in Applied Chemistry of the National Polytechnic Institute in 1990 and received his Master's degree from the same University in 1993. He received the degree of Ph. D in Engineering from the Faculty of Mechanical Engineering, Tohoku University Japan (1997). His early career holding a Postdoctoral position (1997-2000) at the Research Laboratory of Hydrothermal Chemistry enabled him to develop a deep knowledge on the basic fundamental chemistry science of the mechanisms related to hydrothermal reactions by undertaking both research and laboratory teaching activities. He joined the Department of Ceramic Engineering at CINVESTAV Saltillo Campus in 2000 to hold a research associate position, and was promoted to lecturer and associate professor in 2004 and 2009 - at present, respectively. His current interests in hydrothermal chemistry include the development of green hydrothermal processing methods for preparing ceramic powders nanoparticles by using raw mineral precursors, particle growth, waste management and microwave-assisted powder processing.

Research Interest:

- Soft Chemistry synthesis
- Ceramic processing
- Hydrothermal reactions
- Nanoparticle synthesis
- Cool sintering processing
- Calcium phosphates synthesis
- Electroceramic powders preparation
- Inorganic pigment preparation

Current Research Project: Hydrothermal reactions applied for synthesising nanostructured inorganic silicate based pigments.

Currently, the research activities conducted at the laboratory of chemistry and hydrothermal synthesis (CINVESTAV-Saltillo), those have been devoted to investigating the chemical equilibrium conditions in the systems $\text{BaO-SiO}_2\text{-CuO-H}_2\text{O}$ and $\text{CaO-SiO}_2\text{-Cr}_2\text{O}_3\text{-H}_2\text{O}$, respectively. I am interested in processing via a single chemical reaction step; the representative coloured pigment crystalline phases of BaCuSiO_6 , $\text{BaCu}_2\text{Si}_2\text{O}_7$, CaCrSiO_6 . The primary research activities are focused to determine the stability diagrams for the aqueous system, which include the stability regions for the mentioned crystalline phases. Additionally, the study is extended to control the embryo crystallization conditions for the preparation nanosized pigment particles. Therefore, this study involves the analysis of various mineralizer aqueous solutions containing different electrolytes, which results in the control of particle morphology as well. Other additional activities related with my research lines involve the following topics: a) the electroceramic material single crystal growth, b) the usage of mineral species for the single step crystallization of valuable ceramics nanostructured compounds, c) inorganic compound hydrothermal cold sintering process, d) solid waste management under hydrothermal conditions.