“Low dimensional” rare-earth-free permanent magnetic materials

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Life Science Center II, Room 130

Abstract: Critical elements such as rare-earth (RE) metals that are subject to supply risks and are incorporated in critical materials, play a central role in the function of these materials. They dictate the properties that control the function of critical materials, including both molecules and materials, used in a broad range of technologically important and energy relevant properties such as superconductivity, magnetism, quantum phenomena, light generation, magnetocaloric behavior, and catalytic activity. It is of high importance to the Department of Energy (DOE) to enable the discovery and design of alternatives to critical materials that reduce or eliminate the need for critical elements. In this seminar, I will present our recent research focused on “designing” new quasi low-dimensional rare-earth-free magnetic materials [1-5], and new van-der-Waals (vdW) crystals showing both high Curie temperatures and large magnetic anisotropy as well as efficient spin-orbit torque.[6,7] Furthermore, I will present a new reaction developed in our group that enables the synthesis of some of these materials at the nanoscale, a major step toward fulfilling their huge potential [8].

References:

Biographical Sketch: Boniface P. T. Fokwa obtained his BS and MS from University of Yaounde I (Cameroon), his PhD from Dresden University of Technology (Germany). He is currently a full Professor of chemistry at University of California, Riverside. He was a visiting scientist at the University of Auckland (New Zealand, 2011), at Cornell University (USA, 2012) and a visiting Professor at the University of California, Los Angeles (USA, 2014-2015). He is a recipient of several awards including DFG Heisenberg (Germany) and NSF CAREER Awards. He is a section editor of the Wiley journal Encyclopedia of Inorganic and Bioinorganic Chemistry and served as the chair of the Solid State Chemistry Subdivision of the American Chemical Society.