



Library Indian Institute of Science Education and Research Mohali



DSpace@IISERMohali (/jspui/)

/ Publications of IISER Mohali (/jspui/handle/123456789/4)

/ Research Articles (/jspui/handle/123456789/9)

Please use this identifier to cite or link to this item: <http://hdl.handle.net/123456789/5137>

Title:	An interesting heterometallic complex $[\{Ni_2(\kappa^2-SeC_5H_4N)_2(\mu-OCH_3)CdCl\}_2]$ as single source molecular precursor for NiSe/CdSe heterostructure: Consequence of similar Ni-Se and Cd-Se bond distances
Authors:	Singla, Labhini (/jspui/browse?type=author&value=Singla%2C+Labhini) Choudhury, Angshuman Roy (/jspui/browse?type=author&value=Choudhury%2C+Angshuman+Roy)
Keywords:	Nickel selenolate Heterometallic Ni-Cd selenolate complex
Issue Date:	2021
Publisher:	Elsevier
Citation:	Journal of Organometallic Chemistry, 949, 121955.
Abstract:	Since Ni and Cd belong to the 3d and 4d series of transition elements respectively, common perception insists that Ni-Se and Cd-Se bond distances in molecular complexes will be quite different. Present work reports the successful synthesis and detailed characterization of cis-configured mononuclear complex $[Ni(SeC_5H_4N)_2(dppe)]$ (1) as well as novel tetranuclear heterometallic Ni-Cd complex $[\{Ni_2(\kappa^2-SeC_5H_4N)_2(\mu-OCH_3)CdCl\}_2]$ (2). Here, the complex $[Ni(SeC_5H_4N)_2(dppe)]$ act as building block for the preparation of complex 2 which has similar Ni-Se and Cd-Se bond distances (within 0.1 Å). The closeness of these bond lengths has facilitated the preparation of NiSe/CdSe heterostructure. The prepared NiSe/CdSe heterostructure has been thoroughly characterized by pXRD, SEM, TEM and EDS, while diffuse reflectance spectroscopy (DRS) was used to evaluate the bandgap of the heterostructure. Detailed structural analysis of molecular assembly further endorses that bond length similarity of Ni-Se and Cd-Se in complex appears as the key factor in getting the heterostructure upon thermolysis of complex. DFT calculations revealed that underlying spin moments of heterometallic system commands the complex to have Ni-Se and Cd-Se bond distances within 0.1 Å range. The magnetic interactions in complex were reaffirmed by weak ferromagnetic ordering observed in superconducting quantum interference device (SQUID) analysis of molecular assembly at lower temperature. It is believed that controlled preparation of NiSe/CdSe heterostructure from novel single source heterometallic precursor reported in the present work will assist the synthesis of functional chalcogenide materials with technological importance.
Description:	https://www.sciencedirect.com/science/article/pii/S0022328X2100276X?via%3Dihub
URI:	https://www.sciencedirect.com/science/article/pii/S0022328X2100276X?via%3Dihub (https://www.sciencedirect.com/science/article/pii/S0022328X2100276X?via%3Dihub) http://hdl.handle.net/123456789/5137 (http://hdl.handle.net/123456789/5137)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:


File	Description	Size	Format

Need To Add...Full Text_PDF
(/jspui/bitstream/123456789/5137/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF)

15.36 Unknown
kB

[View/Open \(/jspui/t](#)

[Show full item record \(/jspui/handle/123456789/5137?mode=full\)](#)

 [\(/jspui/handle/123456789/5137/statistics\)](#)

Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.