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Formation and properties of SiC nano-particles colloids in non polar liquids

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Resume : The goal of this work is to form SiC nanoparticles colloids in non polar liquids toward temperature sensing application in lubricant. The formation of stable SiC colloids in polar liquids like water or ethanol has been demonstrated and explained by their surface chemistry resulting in a negative zeta potential [1, 2]. The strong fluorescence emission of these colloids led to application as a non toxic bio label [3]. Here, we will present surface functionalization of SiC nanoparticles by long chain amines (nonylamine, octadecylamine) in order to disperse them in non polar liquids like alkane or alkene. The SiC nanoparticles have been obtained by two different top-down technology : the first is electrochemical anodization of polycrystalline SiC in an hydrofluoric acid-ethanol mixture, the second is chemical etching of micrometer size SiC particles in a hydrofluoric -nitric acid mixture. Chemical (FTIR, Raman), structural (TEM, DLS) and optical characterization (fluorescence and fluorescence lifetime) of the resulting colloids will be presented.

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[3] J. Botsoa, V. Lysenko, A. Geloën, O. Marty, J.M. Bluet and G. Guillot, Appl. Phys. Lett. 92, 173902 (2008).