International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.11 No.01, pp 134-140, 2018

# Spectroscopic Interrogations and Study on the Insulating Property of Vermiculite Based Weathering Tiles

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**Abstract :** Vermiculite is a versatile mineral because of its thermal stability and inertness. All the five grades of vermiculites both in raw and exfoliated vermiculite forms have vast applications. The grade **V** exfoliated vermiculite is used as the weathering proof material for building constructions. It keeps interior cool in summer and reduces heat loss in winter. The FTIR-ATR spectra of pathway tiles, cement vermiculite and granite vermiculite weathering tiles samples have been recorded in the mid - infrared region of 4000-450 $cm^{-1}$. In general, vibrational spectroscopy detections can qualitatively and quantitatively distinguish the spectral assignment of specific bands between corresponding bonds and functional groups, as also the observation of spectral profiles can be used to define and differentiate the pathway tiles, cement and granite vermiculite tile. The present work is aimed to make an investigation with reference to the insulating property of the vermiculite tiles. The diffusion reflectance spectroscopy technique confirms that with increase in wavelength, the band gap energy decreases. Further, UV-Vis measurements prove the reduction of optical band due to increase of structural disorder of cement vermiculite tile, granite vermiculite tile and pathway tile. The dielectric measurements were carried out to analyze the insulating property of cement and granite vermiculite tiles. It is observed that dielectric constant and dielectric loss of vermiculite decrease with increase in frequency. However cement vermiculite tile to granite vermiculite tile it is noted that there is an increase in the dielectric strength of the material, as it possess low dielectric constant as well as dielectric loss.

**Keywords :** Cement vermiculite tiles, Granite vermiculite tile, Pathway tile, Composites, FTIR-ATR, UV-Visible, dielectric measurements.



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