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Synthesis, characterization and optical properties of mono- and bis-chalcone

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ABSTRACT

Mono- and bis-chalcone have been synthesized by the reaction of 3-acetyl-2,5-dimethylthiophene and N, N-di-methylbenzaldehyde/terephthalaldehyde in ethanolic NaOH in microwave oven. The structure of these compounds was established by elemental analysis, IR, ¹H NMR, ¹³C NMR and GC–MS spectral analysis. Thin films with thickness of 100 nm of mono- and bis-chalcone were evaporated by thermal evaporation onto glass/Si wafer substrates under a vacuum of 10⁻⁶ Torr. The optical constants (absorption coefficient and optical band gap) of these films have been studied as a function of photon energy in the wavelength region 300–1100 nm. Analysis of the optical absorption data shows that the rule of non-direct transitions predominates. The optical band gaps for mono- and bis-chalcone are found to be 2.31 and 0.99 eV respectively. It has been found that the absorption coefficient changes with increasing photon energy. The peak values of the absorption coefficient are found to be at 370 nm for mono-chalcone and 460 nm for bis-chalcone thin films.