

Editorial note: *The full paper of this work is transferred to
Volume 21 of the Sri Lanka Journal of Physics; SLJoP 21 (2021)*

Physical Characterizations of Casein by Using Electrochemical and Spectroscopic Techniques

T.R. Senevirathne*, G.C. Wickramasinghe, V.P.S Perera and K.T. Hettiarachchi

The Department of Physics, Faculty of Natural Sciences,

The Open University of Sri Lanka, Nawala

**tharikaridmanji@gmail.com*

ABSTRACT

Casein is the major protein present in cow's milk. Lowering the pH of cow's milk by addition of acids, natural casein can be precipitated to utilize in polymer matrix of thin films to fabricate electrodes of optoelectronic devices. In current study, casein was isolated using acetic acid and thin films of casein were deposited on conducting tin oxide glass plates by doctor blade method. These casein films were physically characterized by using electrochemical and spectroscopic techniques. Mott-Schottky analysis has shown that casein is having an n-type conductivity with flat band potential at - 0.61 V. The electrochemical impedance spectroscopic analysis was used to calculate the electrical conductivity and the dielectric constant of casein, which were found to be 1.13×10^{-2} mS/m and 6.6 respectively. The direct band gap of synthesised casein was determined drawing a tauc plot by using the UV visible spectroscopic data which was found to be 3.9 eV. Fourier transform infrared spectra of the casein sample was recorded to confirm the presence of function groups in the synthesised compound. With this characterization, it was evident that casein is a prospective material for fabrication of future optoelectronic devices by tuning its band gap.