

## The Nonlinear Optical Properties Analysis of AlPc-Cl Organic Compound

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**Abstract :** The properties of nonlinear optical NLOs are examined, and the results confirm the 2.19 eV HOMO-LUMO mismatch. In the Al-Pc cluster, certain functional bond lengths and bond angles have been observed. The Quantum chemical method (DFT and TD-DFT) and Vibrational spectra properties of AlPc are studied. X-ray pattern reveals the crystalline structure along with the (242) orientation of the AlPc organic thin layer. UV-Vis shows the frequency selective behavior of the device. The absorbance of such layer exhibits a high value within the UV range and two consecutive peaks within visible range. Spin coating is used to make an organic diode based on the Aluminium-phthalocyanine (AlPc-Cl) molecule. Under dark and light conditions, electrical characterization of Ag/AlPc/Si/Au is obtained. The diode's high rectifying capability (about  $1 \times 10^4$ ) is subsequently discovered. While the height barrier is constant and saturation current is greatly reliant on light, the ideality factor of such a diode increases to 6.9 which confirms the non-ideality of such a device. The Cheung-Cheung technique is employed to further the investigation and gain additional data such as series resistance and barrier height.

**Keywords :** AlPc-Cl organic material, nonlinear optic, optical filter, diode

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