Thin films of chlorosubstituted vanadyl phthalocyanine: charge transport properties and optical spectroscopy study of structure

BASOVA, Tamara V., KISELEV, Vitaly G., KLYAMER, Darya D. and HASSAN, Aseel <http://orcid.org/0000-0002-7891-8087>

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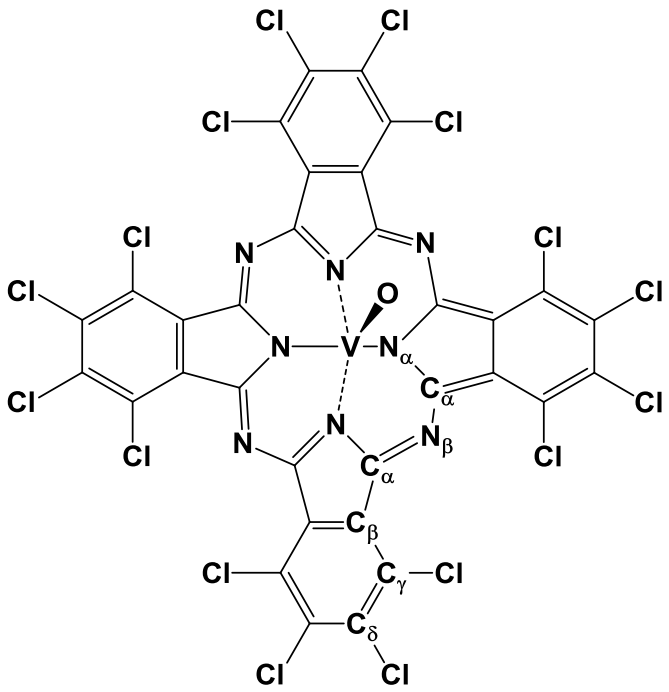

Figure 1. Structure of $VOPcCl_{16}$ molecule.

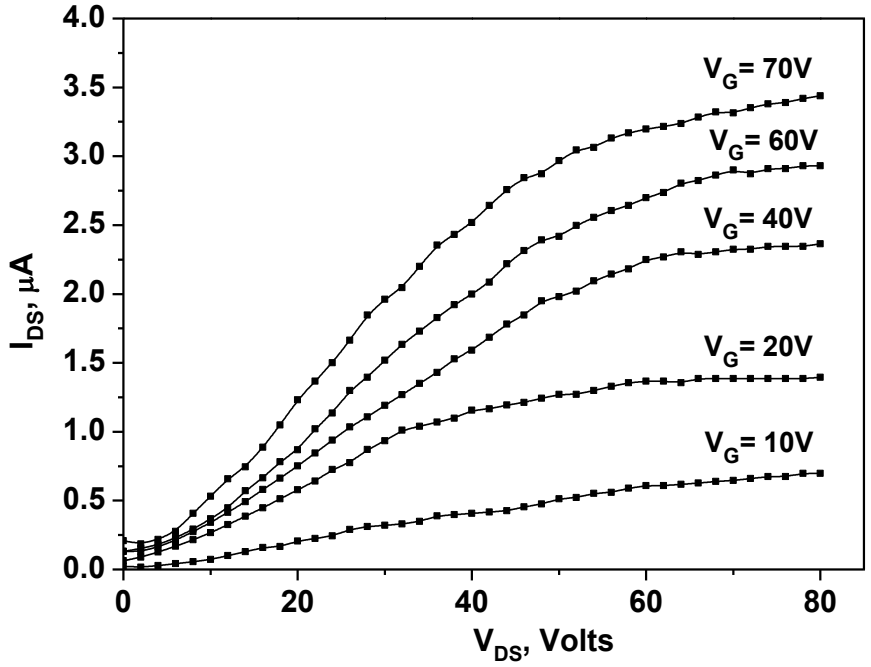

Figure 2. The source-drain current (I_{DS}) as a function of drain-source voltage (V_{DS}) characteristics of field effect transistor based on $VOPcCl_{16}$ film at various source-gate voltage values (V_G). The experimental points are black squares connected with splines to visualize trends.

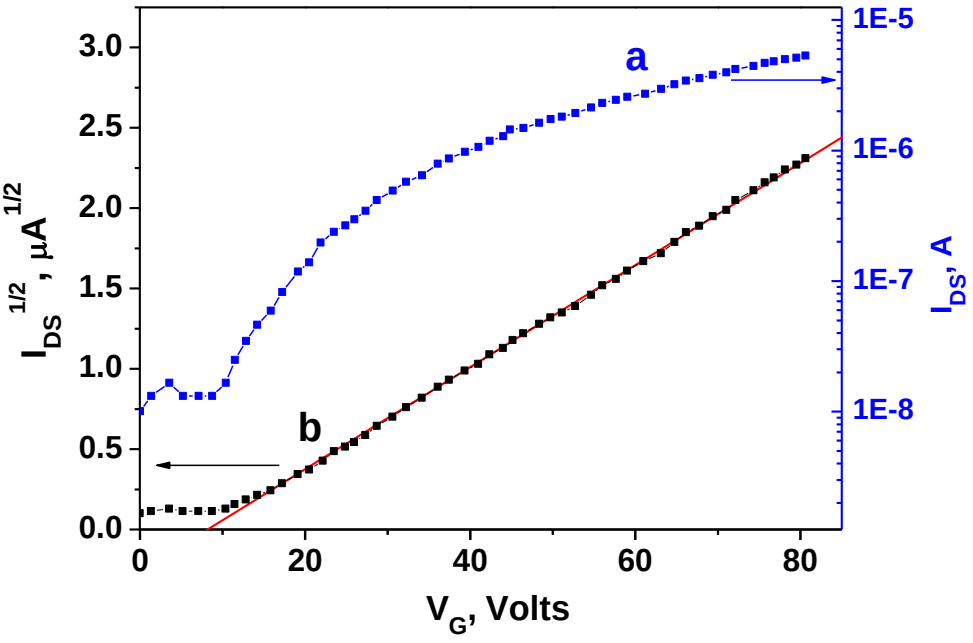

Figure 3. (a) The transfer curves I_{DS} versus V_{GS} for a field effect transistor based on $VOPcCl_{16}$ film at $V_{DS} = 80V$. (b) $\sqrt{I_{DS}}$ versus V_{GS} for a fixed drain-source voltage of 80 V in the saturation regime.

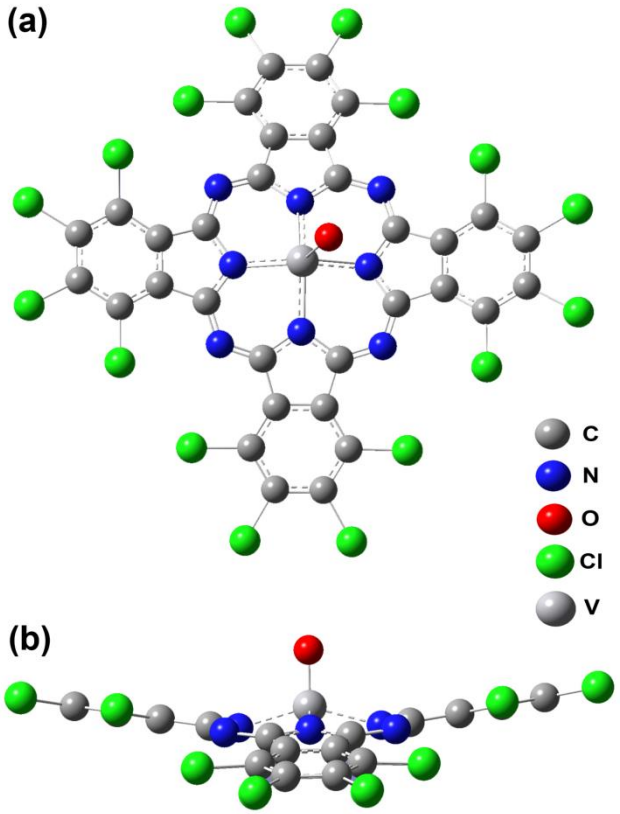

Figure 4. B3LYP/6-311++G(2df,p) optimized structure of the $VOPcCl_{16}$ molecule: (a) top view; (b) side view.

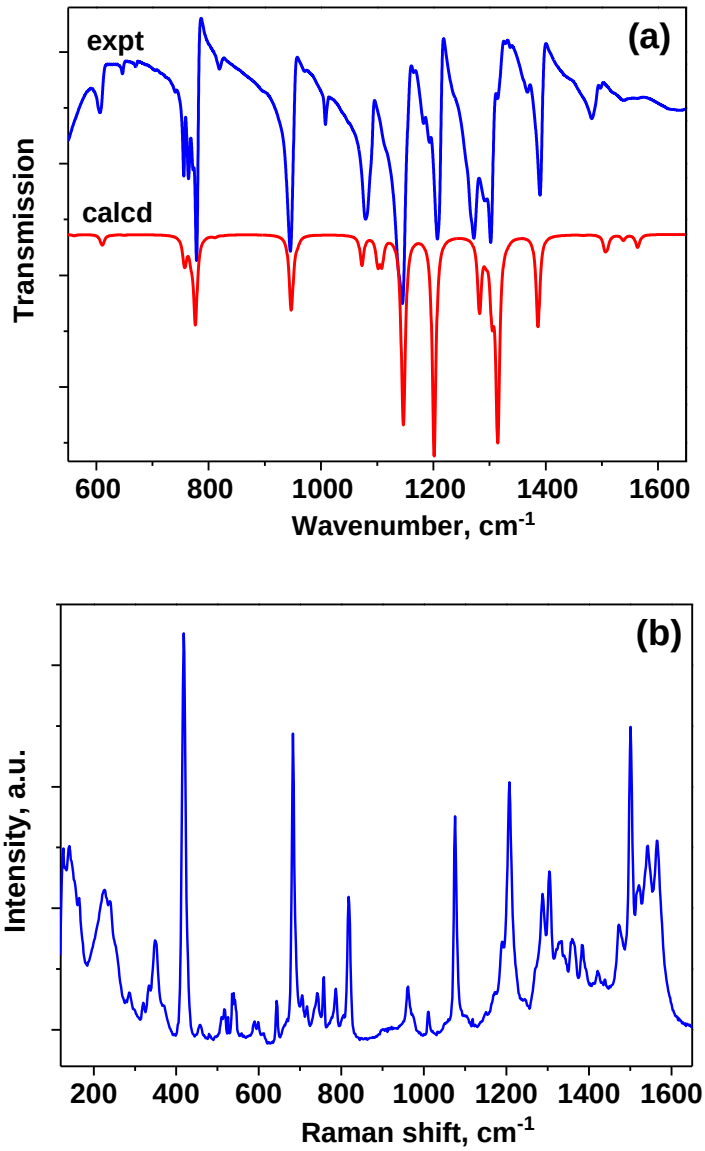

Figure 5. (a) IR spectra of $VOPcCl_{16}$: experimental (blue graphic) and B3LYP/6-311++G(2df,p) calculated (red graphic); (b) Experimental Raman spectrum of $VOPcCl_{16}$.

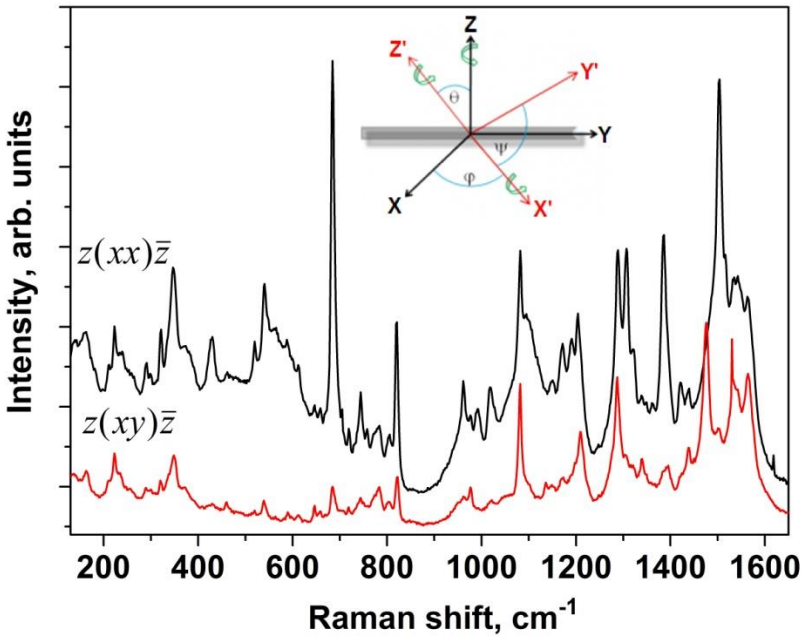

Figure 6. Polarized Raman spectra of $VOPcCl_{16}$ film (glass substrate), recorded in the parallel ($z(xx)\bar{z}$) and cross ($z(xy)\bar{z}$) polarizations of the incident and scattered light. The inset illustrates the coordinate notation: the Euler angles φ, θ (which is the tilt angle between Z and Z*'*), and ψ correspond to rotations around the Z-axis of a substrate, the molecular *X'*-axis, and around the Z*'*-axis of a molecule, respectively.

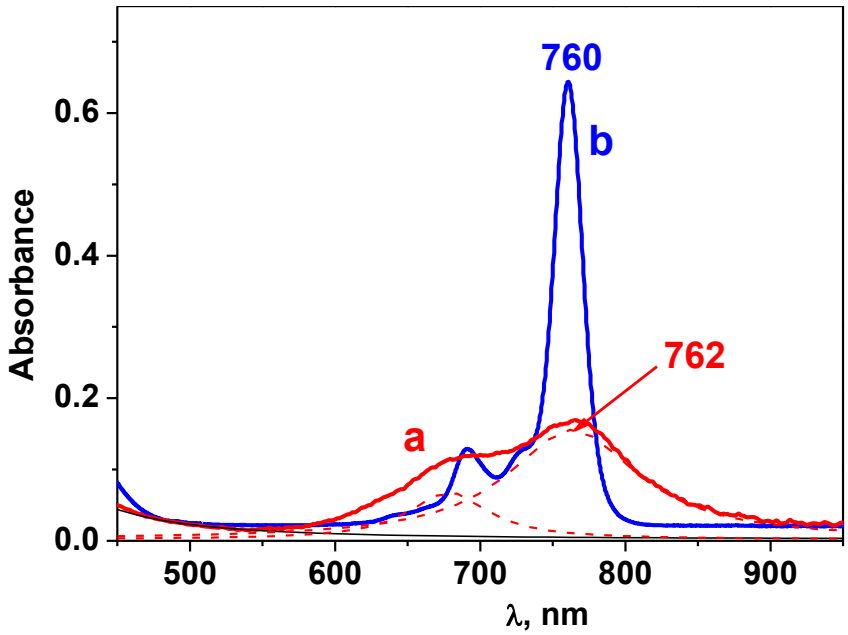

Figure 7. The UV-vis absorption spectra of $VOPcCl_{16}$ in the thin film (a, red graphic) and its Lorentzian band fit (red dotted lines) as well as the spectra in solution (10^{-5} M) of 1-chloronaphthalene (b, blue graphic).