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Comment to the article "Analysis of photoluminescence, UV absorbance, optical band gap and threshold voltage of TiO_2 nanoparticles dispersed in high birefringence nematic liquid crystal towards its application in display and photovoltaic devices" [J. Lumin. 192 (2017) 33–39]

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In mid-2017, Pathak et al. reported optical and electrical properties of TiO_2 naoparticles dispersed nematic liquid crystals [1]. But the authors calculated optical band gap of the materials using unscientific and wrong technique, and also they didn't record photoluminescence spectrum of nematic liquid crystals carefully.

In Fig. 3 of ref. [1], authors represented photoluminescence behavior of pure and TiO_2 nanoparticles dispersed nematic liquid crystals and they wrote just photoluminescence in Y-axis. Authors should write in Y-axis as photoluminescence intensity along with unit (arbitrary unit). From Fig. 3, it is also clear that pure nematic liquid crystals does not have any emission of light. Authors should keep in mind that nematic liquid crystals as well as other thermotropic liquid crystalline materials emit visible light, though intensity is low [2–7]. The authors should take more care to record photoluminescence spectra of pure nematic liquid crystals.

In Fig. 4, authors presented optical band gap of the pure and TiO_2 dispersed nematic liquid crystals. They have used Tauc plot to calculate optical band gap. The Tauc plot is generally used to estimate optical band gap of the direct band gap semiconductor by extrapolating the most linear region of the $(\alpha h\nu)^2$ versus $(h\nu)$ curve to the energy axis at $(\alpha h\nu)^2 = 0$ [8,9]. The authors' extrapolation technique is completely unscientific and wrong. They just drew a straight line from the end point of the curve to energy axis according to their choice. They also did not take value of band gap energy at $(\alpha h\nu)^2 = 0$. The authors should put the unit for $(\alpha h\nu)^2$ as $(cm^{-1}eV)^2$ or $(m^{-1}eV)^2$ in Fig. 4.

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