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## Azo substituted achiral bent-core liquid crystals: Photo-induced studies in $B_7$ and $B_2$ mesophases

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A new surge of activity in the field of ferro-/antiferro-electric liquid crystals was prompted in 1996 by the observation of ferroelectric switching in achiral bent-core compounds. Later, several such compounds exhibiting electro-optically switchable mesophases were reported. The first photochromic azo functionalized bent-core liquid crystals were reported by us in 2001. The reversible photo-induced effects observed, in transition temperatures and electro-optical switching properties of the mesophases exhibited by these compounds have added a new dimension to the exciting field of bent-core liquid crystals. Thus, we continued our investigations on such azo functionalized compounds from various aspects. In this presentation, I will be describing three structural variants of azo substituted achiral bent-core compounds constituting of symmetrical and non-symmetrical molecules. It was found that the non-symmetrical molecules are more conducive to mesomorphism than the symmetrical ones. We observed B1 ($Col_r$), $B_2$ ($SmC_AP_A$) and $B_7$ mesophases in these compounds. The $B_7$ mesophase was found to have a modulated layer structure. We also report for the first time, the photo-induced studies in the $B_7$ mesophase and make a comparison of these results with those obtained in a $B_2$ mesophase. From our studies, we observed that these effects are more profound in the case of $B_7$ mesophase when compared to the $B_2$ mesophase in such systems.

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## Low-dimensional nanostructures based high-performances photodetectors

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During the past few decades, we have witnessed that the booming photoelectronic industry has transformed the world and stretched throughout every facet of our lives. As one of the most important optoelectronic devices, photodetectors, which possess the ability to transform light into electrical signals precisely, have been capturing intensive attention. Low-dimensional nanostructures are ideal systems for constructing high-performance photodetectors due to their tailored geometries, high surface-area-to-volume ratios and rationally designed surfaces. Up to now, various sophisticated techniques, such as metal-organic chemical vapor deposition (MOCVD), molecular beam epitaxy (MBE), pulsed laser deposition (PLD), atomic layer deposition (ALD) and magnetron sputtering have been developing rapidly, which has provided vast opportunities for thin-film based materials, especially GaN and GaAs based photodetectors, to be successfully commercialized. However, fabricating photodetectors focusing on the aforementioned techniques usually requires high operating costs, which will hamper further scale-up production of such photo electric devices. Therefore, it is of great importance to explore novel and facile techniques for fabricating high-performance photodetectors with low cost. In this talk, we will present the latest progress, the current challenges and an outlook on the future developments of low-dimensional nanostructures based high-performances photodetectors.

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