

Structures of gold nanoparticles dispersed in liquid crystals have attracted attention for the possible development of novel materials based on the controlled assembly of the nanoparticles. The properties of such materials, in most cases, significantly differ from those of the host materials. Experiments have shown the gold nanoparticles doped cholesteric liquid crystal material is self-organized texture which distinguished optical, thermal, electro and photooptical properties. Recently we have developed a new concept, which allows to dissolve in the cholesteric liquid crystals high concentration (4-6%wt) of gold nanoparticles, without destruction of cholesteric structure. Prepared substances were investigated optically, thermo, electro and photooptically. Obtained results can lead to a new concept towards the realization of an advanced generation of photonic crystals based nanostructured materials and devices, such as: equipments for the visualization of temperature distribution at micro and nanoscales, liquid crystal semiconductors, novel solar cells with enhanced photooptical properties, new generation of reflective displays, detectors for the visualization of cancer cells and devices for the thermal ablation of tumour.