Development of NLO Active Organic Molecular Glasses for Photonic Applications

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Over the last two decades increased interest in the development of organic photonics and optoelectronics is driven by demand for new cost effective high performance materials which are easy to process. Most of attention is focused on such application areas as photovoltaic, lighting and optical data processing. The key process in manufacturing organic photonic device for above mentioned applications is preparation of uniform thin films. In general there are two methods to prepare such films – thermal vacuum vapor deposition and solution based methods like spin coating. For the first one high cost of equipment and processing are characteristic. Solution based thin film production processes are less demanding therefore became more and more popular among researchers in field of organic optoelectronics and photonics. Nowadays polymers and polymer composites are most intensively employed in attempts to create devices via solution based technology. Among them there has also been increasing interest in so called "organic molecular glasses" as photonic thin film materials[1,2]. Compared to polymeric systems, organic molecular glasses do not need complicated chemical synthesis or purification processes and has a well-defined structure.

Within last decade our attention is paid to develop organic materials for nonlinear optical (NLO) applications. During our research it came to our attention that the presence of triphenylmethyl and triphenylsilyl substitutes noticeably enhances amorphous phase formation of low molecular weight molecules[3]. Exploiting this molecular motif large amount of glass forming structures with different active chromophores, are synthesized at RTU.

With scope of above mentioned applications thermal, optical and NLO properties of these compounds are intensively investigated at ISSP UL. In this contribution we would like to present our investigation results and discus possible structure property relations within this new class of low molecular glasses.

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