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P80. Thermo-Induced Non-Centrosymmetric Crystal Growth in Glassy Thin Films of Azobenzen Chromophore

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During the last decades non-linear optical (**NLO**) active organic molecules, have been investigated as precursors for creating materials usable in electro-optical telecommunication devices.

Within our investigations of **NLO** active molecular glasses containing azobenzene chromophore we have synthesized compound **PP** (see Fig.1). This compound forms glassy film from solution. After thermo assisted corona poling orientation of chromophores become noncentrosymetric and therefore film turn out to be **NLO** active. Typically such **NLO** activity vanishes out when films are heated to glass transition temperature $\mathbf{T_g}$, in our case ~40°C. Unusual situation takes place when one heats poled film of PP to higher temperatures then $\mathbf{T_g}$ – at around ~90°C growing of noncentrosimmetrical **NLO** active phase take place. Similar NLO active crystal growth at elevated (~80 °C) temperature observed in case of unpoled (as cast) films. Unfortunatly these films are polycristalic, opaque and therefore unusable for practical aplications.

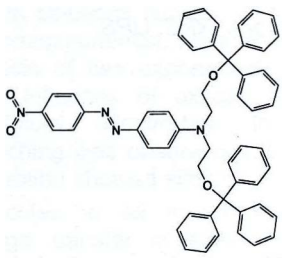

Fig. 1. Azobenzene structure of PP

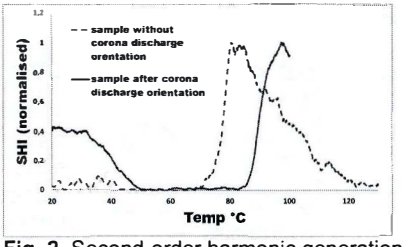

Fig. 2. Second-order harmonic generation dependency of temperature

One of possibilities to reduce optical non-homogenity of the films is to use polymer matrix with matching refractive index as a media for crystal growth.

NLO properties and phases transition behavior of PP chromophore in neat films and in polymer host will be discussed.

Keywords: *non-linear optics, second order harmonic generation, glassy films, crystal growth.*