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13. ABSTRACT (*Maximum 200 words*)

NMR spectroscopy identified the main impurity in DAST films grown by OVPD method. The impurity is a trimethilated compound described in last month report. Thus our films consist of over 90 % DAST and some 5 to 10 % of the above impurity.
An apparatus for measuring second harmonic generation properties ofOVPD DAST films has been constructed and described. We expect to do quantitative measurements this month.
We continue the optimization of growth conditions of the OVPD method
This month we shall grow from tosylate starved atmosphere and study effects of substrate nature on optical properties of grown films.

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PROGRESS REPORT #4

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Period covered: 01 Nov1994 - 01 Dec1994
Contractor: PD-LD Inc., 209 Wall Street, Princeton, NJ 08540
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Title: A New Growth Technology For Highly Non-Linear, Optical Quality Organic Films: Organic Vapor Phase Deposition

Work performed:

1. NMR analysis of DAST films;

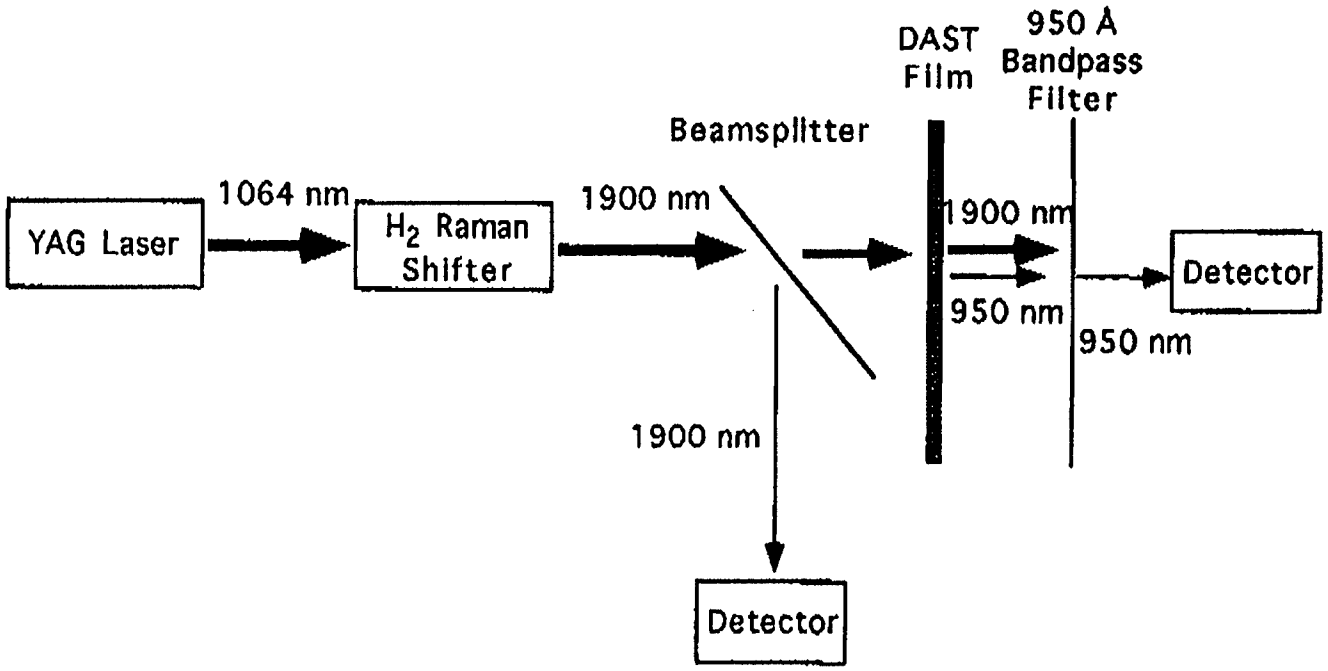
In the last month report we described the plan to elucidate the nature of the by-product detected in the NMR analysis of DAST films grown by the OVPD method. The analysis has shown that the main by-product is the trimethilathed species,[structure **A** in the Progress report No.3]. Thus, the OVPD grown films consist of at least 90% DAST and 5-10 % of the above by-product. The analytical results will be described in more details in the next months report.

2. Growth experiments

We are continuing optimization of the growth conditions. In view of the analytical results, we are concentrating on growth of films with less tosylate rich growth atmosphere. The other approach is to grow films on substrates other than glass slides, in order to ascertain the effect of the nature of the substrate on the optical quality of films.

3. Second Harmonic Generation experiments

We have observed second harmonic generation, [SHG}, of green light from 1064 A infrared fundamental. Qualitatively, the intensity of green light is of the same order as that observed from crystals of pure DAST obtained from JPL. Encouraged by this result, we have set out to quantify the second harmonic generation efficiency of the OVPD grown films. Since DAST strongly absorbs green light, it is difficult to perform a quantitative measurements using 1064/532 nm light. By building an H2 Raman shifter, we are able to perform a direct χ^2 measurements using 1900/950 nm light, neither of which is strongly absorbed by DAST. The optical system illustrated, [see figure], has been completed and will now enable us to quantitavely asses the χ^2 efficiency of our films compared to pure DAST. This analysis will enable us to optimize the film growth for SHG applications.



Apparatus for measurement SHG activity of DAST films grown by the OVPD method