

## Raman Spectroscopic Study of Siloxane Structures Developed Under Low Pressure

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As a part of our study of polymerization process of aminopropylsilanetriol (APST) we investigated the behavior of APST dissolved in water (~25%) under low pressure (~ 5 mbar) by Raman spectroscopy. It has been already noticed that the polymerized structure of APST depends significantly on the temperature at which the condensation took place [1]. At the same time the speed of evaporation of water could also play important role in forming different polymer structures. In order to distinguish between these two influences, the glass tubes with solution were connected to the vacuum pump and exposed to the low pressure of ~5 mbar for one to three hours. The samples with different concentrations of water were then left to polymerize under atmospheric conditions. In order to determine the starting water content, the samples were weighted after being exposed to the low pressure and at the end of the condensation process.

Raman spectra of solutions and of condensed samples were recorded. Structure developments were also monitored under mid-magnification optical microscope.

The spectra of solutions show the change in distribution of water clusters present in different solutions [2]. Concentration of tetramers, pentamers and hexamers is increasing with decreasing content of water. On the other hand, the same condition favors formation of *gauche* conformation of propyl chain in APST molecules [3]. At the same time the accelerated decrease of water contents hinders the formation of siloxane ladder structure [4] in APST polymer.

- [1] V. Volovšek, L. Bistričić, K. Furić, V. Dananić, I. Movre Šapić, J. Phys.: Conference Series. 28 (2006) 135-138.
- [2] M. Starzak, M. Mathlouthi, Food Chemistry 82 (2003) 3-22.
- [3] L. Bistričić, V. Volovšek, V. Dananić, I. Movre Šapić, Spectrochim. Acta A 64 (2006) 327-337.
- [4] V. Volovšek, L. Bistričić, K. Furić, V. Dananić, I. Movre Šapić, J. Mol. Struct. 834 (2007) 414-418.