

# SOLUTION CRYSTALLIZATION ANALYSIS BY LASER LIGHT SCATTERING: APPLICATIONS TO POLYOLEFINS

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## ABSTRACT

Understanding polymers and their behaviour is very important for academics and industry. Various techniques for characterizing polyolefins do exist. Based on the work done by Shan<sup>1</sup> et al we built an instrument to study polymers in solution during heating and cooling cycles directly. SCALLS has proved to give detailed information about the crystallization and dissolution/melting of the polymer depending on the type of temperature cycle used. Information is obtained directly by use of lasers and thus more detail and in certain cases better resolution compared to traditional techniques with longer analysis time<sup>3</sup>. The original instrument was equipped with one red laser, 635 nm but with further modifications we added two extra lasers, green, 532 nm, and blue, 405 nm. A laser is scattered by a particle that is roughly 1/6 of the wavelength of the laser and thus the shorter wavelength lasers will be scattered by smaller particles and thus the start of crystallization be tracked sooner. In this presentation the effectiveness of the new lasers will be shown by examples of different polymers at different cooling rates. The data will be compared to CRYSTAF and this will show that in certain cases more detail of the crystallization process is seen in SCALLS. Below is a comparison between CRYSTAF and SCALLS of selected samples.

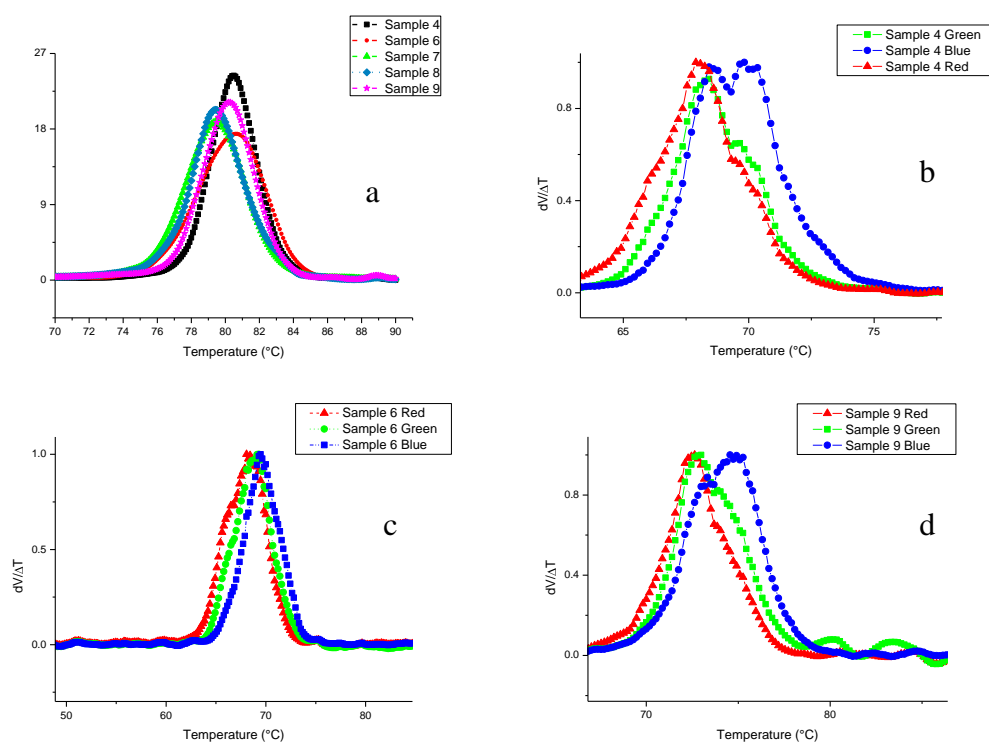


Figure 1: Selected samples of a heterogeneous PP analysed on the CRYSTAF (a) and SCALLS (b-d)

## References:

- (1) Shan, C.L.P.; de Groot, W.A.; Hazlitt, L.G.; Gillespie, D. *Polymer* **2005**, *46*, 1175.
- (2) Van Reenen, A.J.; Brand, M.; Rohwer, E.G.; Walters, P. *Macromolecular Symposia* **2009**, *282*, 25