

Introduction

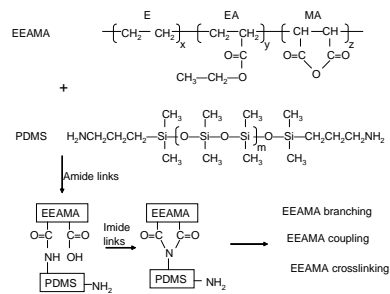
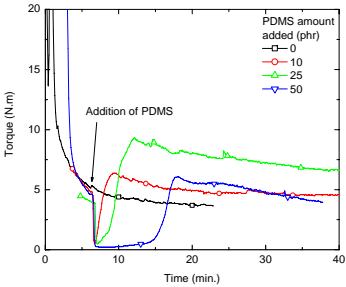
- Poly(dimethylsiloxane) (PDMS) modified polyolefin can be used as processing aids as well as a surface modifiers for polyolefin like LLDPE, HDPE.
- PDMS chemically bonded to polyolefin will avoid the bloom effects which can make the surface tacky and contaminated.

Objectives

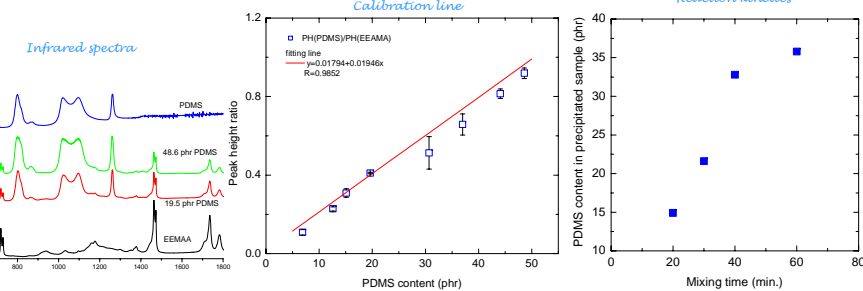
- To obtain a PDMS containing polyolefin by grafting EEAMA with an aminopropyl terminated PDMS;
- To study the reaction kinetics during the reactive processing;
- To investigate the changes in the properties (molecular weight, rheological, and surface) as a result of the grafting;
- To explore potential applications for the modified polymers.

Grafting reaction

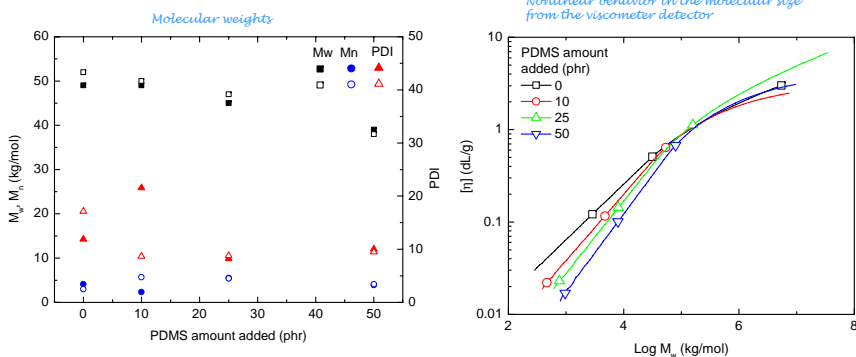
1. Torque curves and reaction mechanism



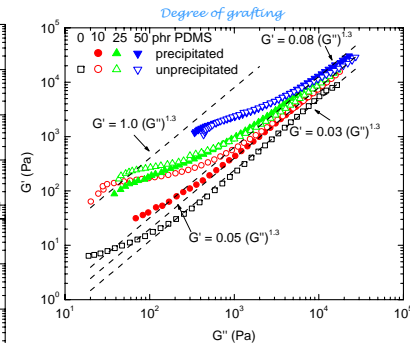
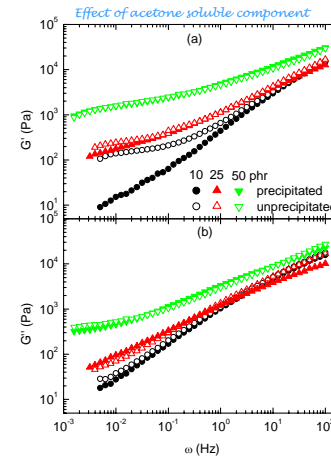
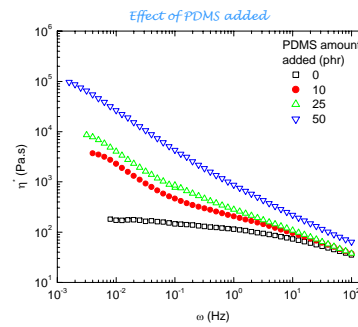
2. Acetone insoluble fraction by IR



3. GPC analysis

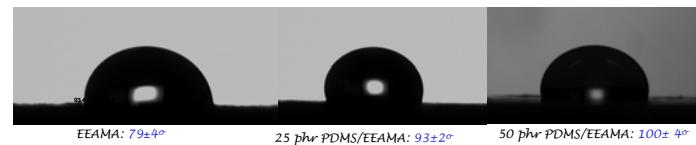


4. Rheological properties

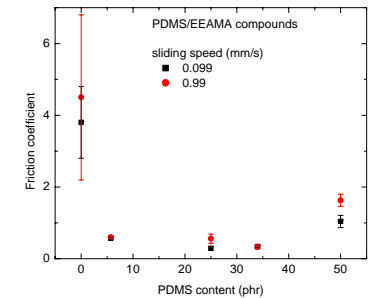


5. Surface properties

Static contact angle measurements

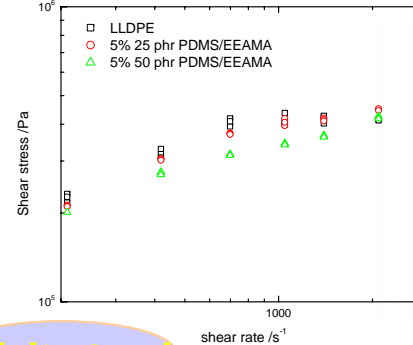


Tribological property

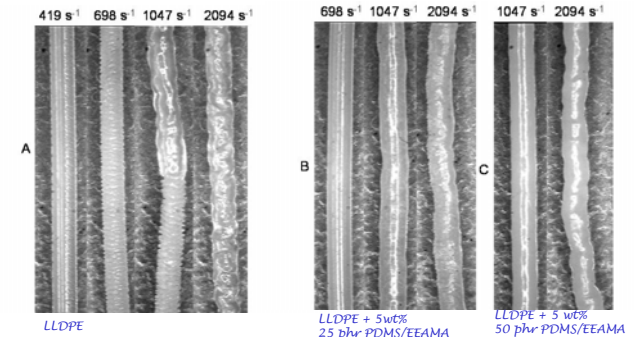


Applications

1. Shear stress reduction



2. Reduction of extrudate surface defects



Concluding Remarks

- The grafting reaction between EEAMA and amino-terminated PDMS in the melt leads to increases in torque, molecule weight, and thus viscosity and moduli;
- The PDMS modified polymer contains a majority of acetone insoluble component, in which the PDMS content increases with mixing time, and a fraction of acetone soluble component which is very elastic;
- The grafting leads to dramatic changes in surface properties like contact angle and frictional coefficient;
- The PDMS modified polyolefin is shown to be able to reduce the shear stress at the wall in a capillary die and improve the extrudate appearance of LLDPE at a concentration of 5 wt%.