



OP-17-1319

Wednesday, May 11, 2011, 06:20-06:40 pm  
Room: Karam 3

**IMPROVEMENT OF HYDROPHILIC PART OF POLYETHYLENE PELLETS BY FUNCTIONALIZATION OF MMA MONOMER WITH COLD PLASMA TREATMENT**

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In this work, the hydrophilicity of HDPE surface in the form of pellets was improved by low temperature (cold) plasma treatment in a mixture of nitrogen and air plasma. Moreover, methyl methacrylate (MMA) monomer was added before treating in order to introduce the hydrophilic parts to the neat HDPE pellets compared to the samples which added an initiator (DCP). The change in hydrophilicity was analyzed by contact angle measurement. The value could be reduced from 96.8° prior to plasma treatment down to around 84.03° after treatment for 30 sec. The polar component of surface free energy of all samples were increased from the untreated HDPE from around zero to 11.92 mN/m indicating that MMA monomer and an initiator were successfully introduced the polar part to the HDPE. From SEM images, it shows the roughness of all treated samples comparing with HDPE sample and so in accord to contact angle and surface free energy results. Furthermore,  $E_a$  for decomposition was increased after incorporating MMA; i.e. from 300.34 kJ/mol for pure HDPE to 358.50 kJ/mol for MMA treated samples.