



THE EFFECT OF ADDING POLYSILANE ON HEAT FUSION PROPERTIES OF VARIOUS KINDS OF POLYETHYLENE

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The present study is aimed to investigate the effect on the heat-fusion properties of various kinds of PE materials (HDPE, MDPE, LDPE, LLDPE, and UHMWPE) by adding different kinds of polysilane; (a) linear structure (MW=500~24,900) for brevity as PMPS, (b) ring structure (MW=900) as PDPS, and (c) branched structure (MW=1,100) as PPSi. When adding PMPS (MW=500) on the surface of all PE samples, the peeling strength increased and they can be heat-fused at much lower temperature in comparison with the neat sample without PMPS. However, when adding PDPS or PPSi having almost the same molecular weight on the surface of the PE samples, the peeling strength decreased dramatically and they cannot be heat-fused even at the same temperature of the neat samples. Moreover, as for the PMPS having higher molecular weight than Mw=500, the peeling strength also decreased dramatically with their molecular weight and they cannot be heat-fused even at the same temperature of the neat samples as well. From the results of EPMS measurement, it was found that only PMPS (Mw=500) can migrate into PE materials and the migration width was getting wider in the order of LDPE, LLDPE, UHMWPE and HDPE. The order was corresponding to the intensity of molecular motion at the amorphous region in each PE material. From these results, it was deduced that only PMPS (Mw=500) can be compatible with PE materials and it can move in the PE materials through their amorphous region.