

Study on Reuse of UrineWetness Scrap

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Abstract: Urinewetness scrap was selected as core of aluminum plastic panel replacing LLDPE. Flow ability of the scrap and the surface smoothness of extruding plate, cohesion strength between aluminum panel and core has a remarkable betterment by granulating twice and blending with LLDPE. Aluminum plastic panel has a lower cost and higher strength. It comes to the national industry usage standard.

Key words: urinewetness scrap; aluminum plastic panel; LLDPE

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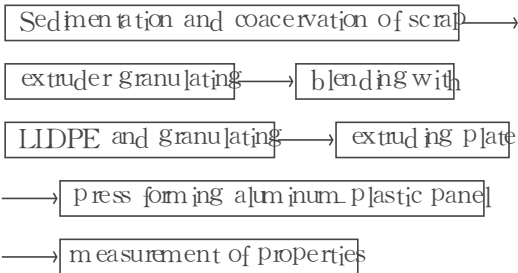
Scarce petroleum resources are used for producing an enormous variety of plastics for an even wider variety of products. Many of the applications are for products with a life cycle of less than one year and then the vast majority of these plastics are then discarded. Not only plastic made from a non renewable resource, but it is generally non biodegradable (or the biodegradation process is very slow). Rejected or waste material usually has good characteristics for recycling and will be clean. In industry there is a growing move towards reuse and reprocessing of plastics for economic as well as environmental reasons.

Cut scrap from urine wetness is more than 30%. In this work, urine wetness scrap was selected as core of aluminum plastic panel to replace the LLDPE. Aluminum plastic panel has been a kind of new building and house resides to use the material and its market foreground is very vast^[1-4].

1 Experiments

Sedimentation and coacervation of scrap

The technology flowsheet of urine wetness scrap modified Experiment



2 Results and Discussion

2.1 Granulating and composition analysis of scrap

S₁ expresses scrap by granulating once, while S₂ is scrap by granulating twice. To remove impurity and longer fiber, perforated plate and filtering net were mounted in extruder die during the second Granulating process. It is quite obvious that granulating twice can increase the flow ability of the scrap and the surface smoothness of extruding plate.

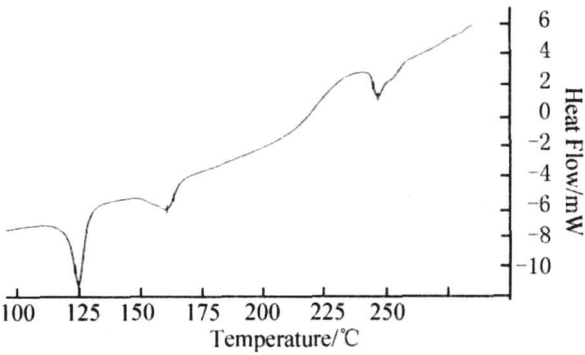


Fig 1 DSC Curves of the urine-wetness scrap (S₂)

Fig 1 displays the main composition of scrap is PE, PP and a little amount polyester fiber.

Tab 1 Effect of Granulating method on Properties of scrap and Aluminum-plastic Panel

Code	MFR /(g·10min ⁻¹)	Tensile Strength /MPa	Tensile Modulus /GPa	180° Peel Strength /(N·m ⁻²)
S1	3.27	23.65	0.736	4.26
S2	4.36	22.05	0.696	5.82

2.2 Modifying of scrap and Properties of Aluminum-plastic panel

In Tab 1, peel strength of aluminum-plastic panel is low in the national industry usage standard (Peel strength over 6 N/m²) by blending scrap with LLDPE at a given ratio in a twin screw extruder. The effect of LLDPE content on properties of scrap and aluminum-plastic panel is shown in Table 2.

Tab 2 Effect of LLDPE content on Properties of scrap and Aluminum-plastic Panel

Code	Scrap /LLDPE	MFR /(g·10min ⁻¹)	Tensile Strength /MPa	Tensile Modulus /GPa	180° Peel Strength /(N·m ⁻²)
S2	100/0	4.36	22.05	0.696	5.82
S2-1	95/5	4.61	20.64	0.675	6.45
S2-2	90/10	5.12	19.25	0.634	6.88
S2-3	85/15	6.26	18.78	0.629	7.19

As shown in Tab 2, melt flow rate and peel strength increased with increasing LLDPE contents.

This behavior could be explained as follows: the increasing cohesion strength between the aluminum panel and the core with increasing LLDPE contents. But tensile strength decreased after modification. Mechanical properties and peel strength can kept in moderate levels when LLDPE content was 5% ~ 10%. It can be used in inside the wall body of build or furniture.

In conclusions, aluminum-plastic panel prepared with urine-wetness scrap has a lower cost and higher strength. It comes to the national industry usage standard.

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尿不湿边角料的再利用研究

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摘 要: 用尿不湿边角料代替线型低密度聚乙烯 (LLDPE) 作为铝塑板的芯层。通过对边角料进行二次造粒及改性处理, 提高了边角料的流动性, 且挤出的芯板表面光滑, 改善了铝板与芯板之间的粘合性。制得的铝塑板具有较低的成本和较高的强度, 达到了国家工业使用标准。

关键词: 尿不湿边角料; 铝塑板; 线型低密度聚乙烯

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