

Utilization of poly(methyl methacrylate) rejection blended with acrylonitrile butadiene styrene resins and the effect on product properties / Achmad Hanafi Setiawan, Achmad Nandang Roziafanto

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20449972&lokasi=lokal>

Abstrak

PMMA is one of the main raw materials for the injection molding process in the lens industries. Since this process requires extremely careful techniques to obtain lens with the best quality, it leads to a high rate of product rejection. These rejected products do not only pose an issue for the industrial environment and require storage space, their price also falls significantly. Among the solutions to this problem is to reuse the rejected products as substitute materials for the manufacture of another product's part such as lamp holders. This process reuses rejected PMMA-containing products in the ABS base polymer industries so as to generate PMMA-containing products with better physical properties. In this experiment, 10 to 40 % (w/w) of rejected PMMA was blended with ABS resins. The monomer content in the ABS resins was analyzed by NMR. Moreover, the mechanical, thermal, and morphological properties of the blended products were also examined. The NMR analysis showed that the resin contained 21.6 % butadiene monomer, in which its value was higher than the value required for materials with high-impact class application. The blend of resins and rejected PMMA (10-30% w/w) could increase the tensile strength value and decrease Izod impact strength and elongation percentage. The morphological analysis showed that this increased PMMA content may also result in widespread brittle areas. Since the blend was designed without compatibilizers, the DSC analysis indicated that the resulting blend in any ratios was not completely miscible. It was revealed that ABS resins containing 10% PMMA was the best blend for the polymer engineering application and this blend still had adequate properties and elastomer content required.