PA80/EPDM BLENDS: PROCESSABILITY AND MECHANICAL PROPERTIES

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In the present study, PA80 was blended with different grades of EPDM terpolymer with variable raw rubber viscosity; among them, two were oil-extended grades. The processability and mechanical properties of the PA80/EPDM blends were studied in detail to identify the EPDM grade suitable with PA80 for extrusion application. The unsaturation content among the EPDM grades was comparable and was relatively compatible with PA80. Accordingly, the technical properties of the blend depend particularly on the ethylene-propylene ratio as well as on the degree of oil extension (lubrication effect). The filler dispersion was also found satisfactory for all the samples studied. The fine extrudates produced from oil-extended EPDM grade made smoother surfaces, but their dimensional tolerance (die swell) was poor. Moreover, the oil-extended matrix undergoes faster degradation under thermal ageing conditions and failed to retain its properties. Therefore, blending EPDM with PA80 can be considered as a technical strategy to compensate for these losses along with the processability advantages. The prime concern in achieving the complete benefits was to select materials with comparable raw rubber viscosities.

Keywords: Die swell, EPDM, Extrusion, PA80, Processability, Superior processing rubber

INTRODUCTION

Natural rubber (NR) is a general-purpose elastomer possessing a good number of properties due to its high molecular weight, strain-induced crystallization and specific viscoelastic properties. The NR is well explored for the development of a variety of commodity rubber products. However, it lacked certain properties like temperature, ageing, oil and abrasion resistance quite necessary for specific technical and engineering applications (Mathew, 2001). In this context, synthetic rubbers (SR) gathered much attraction because they could overcome the limitations posed by NR. They could maintain narrow tolerances in retaining the prevailing properties over varying processing and service conditions. Therefore, to elevate the status of NR to compete against SR, modification is most necessary either through the physical or chemical routes (Fig. 1).

Superior processing (SP) rubber is a physically modified form of NR, which is produced by blending vulcanized latex with fresh field latex or unmodified latex in definite proportions (Baker, 1956; Rubber Research Institute of Malaya, 1967). As the name indicates, it is superior with respect to processability, *i.e.*, it produces faster and

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