

NATURAL RUBBER LATEX-BASED ADHESIVES: EFFECT OF METHYL METHACRYLATE-GRAFTED LATEX ON ADHESIVE PROPERTIES

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The effect of blending natural rubber latex (NRL) with various proportions of methyl methacrylate-grafted natural rubber latex (MGL) on the adhesive properties of NRL is reported in the paper. Blends were prepared by mixing NRL and MGL at various proportions and the adhesive properties studied. The effect of blending MGL with NRL on the glass transition temperature (T_g) of NRL was followed using differential scanning calorimetry (DSC). The adhesion strength of blends was measured by performing peel test on leather to leather joints. Brookfield viscosity, thermogravimetric analysis (TGA) and Fourier-transform infrared (FTIR) analysis of the blends were also carried out. The wettability and hydrophilicity of the NRL/MGL blends were examined by means of contact angle measurement. The effect of compounding on the NRL/MGL adhesive properties was also studied. The incorporation of MGL improved the peel strength of NRL-based adhesives. NRL/MGL adhesive showed good thermal ageing resistance compared to that of the control. The blend containing 20 wt% of MGL registered the optimum peel strength and thermal ageing resistance.

Keywords: Adhesive, Blends, Methyl methacrylate-grafted latex, Natural rubber latex, Peel strength

INTRODUCTION

NRL-based adhesives have the advantages of lower toxicity and freedom from solvent hazards, provision for getting desired viscosity and high total solid content. Lower adhesion strength and poor solvent resistance are the main drawbacks associated with NRL-based adhesives (Wetzel, 1962; Blackley, 1997).

Methyl methacrylate (MMA)-grafted natural rubber (Heveaplus MG or MGL) is one of the chemically modified forms of natural rubber (NR). It is produced by the

graft copolymerization of NRL with MMA monomer in the presence of an initiator. The rigid poly (methyl methacrylate) (PMMA) chains are grafted onto the flexible NR chains which leads to the formation of Heveaplus MG (Gazeley and Wake, 1990; Blackley, 1997 b; Nakason *et al.*, 2001). Heveaplus MG which contains 49 per cent MMA content is termed as MG 49. Self-reinforcing ability and environmental stability are the major advantages possessed by MGL. It has been reported that, the film forming properties of MGL is very poor because the grafting reaction mainly occurs on the surface of the