

PROPERTIES OF RICE HUSK POWDER/NATURAL RUBBER COMPOSITE

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ABSTRACT

The effects of epoxidized natural rubber (ENR) on cure characteristics, mechanical properties, and swelling behavior of rice husk powder (RHP) filled natural rubber (NR) composite were studied. Results indicated that the scorch time t_2 and cure time t_{90} of the composite decrease with increasing filler loading and with presence of a ENR. Minimum torque also increases with increasing filler loading but at similar filler loading shows lower value with the presence of ENR. The mechanical properties of composite viz. tensile strength, tensile modulus and hardness were also improved with additional of ENR.

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REFERENCES

- [1]. English B., Chow P., Bajwa D.S., Processing into composites. In: Rowell R.W., Young R.A., Rowell J.K., Paper and composites from agro-based resources. New York, USA: Lewis Publishers 1997. pp 268 – 300.
- [2]. Sain M., Park S.H., Suhara F., and Law S., “Flame retardant and mechanical properties of natural fibre – PP composites containing magnesium hydroxide,” Polym. Degradation Stability, 83, 363 – 367, 2004.
- [3]. IIRRI 2004; www.irri.org
- [4]. Rozman H.D., Yeo Y.S., Tay G.S., and Abu Bakar A., “The mechanical and physical properties of polyurethane composites based on rice husk and polyethylene glycol,” Polym. Testing, 23, 617 – 623, 2002.
- [5]. Hattotuwa G.B.P., Ismail H., and Baharin A., “Comparison of the mechanical properties of rice husk powder filled polypropylene composites with talc filled polypropylene composites,” Polym. Testing, 21, 833 – 839, 2002.
- [6]. Yang H.S., Kim H.J., Son J., Park H.J., Lee B.J., and Hwang T.S., “Rice-husk flour filled polypropylene composites; mechanical and morphological study,” Composites Structures, 63, 305 – 312, 2004.
- [7]. Ismail H and Abdul Khalil H. P. S., “The effects of partial replacement of oil palm wood flour by silica and silane coupling agent on properties of natural rubber composite,” Polym. Testing, 20 (1), pp 33-41, 2000
- [8]. Geethamma V.G., Joseph R., and Thomas S., “Short coir fiber-reinforced natural rubber composites: Effects of fiber length, orientation, and alkali treatment,” J Appl. Polym. Sci., 55, 583 – 594, 1995.
- [9]. Jacob M., Thomas S., and Varughese K.T., “Mechanical properties of sisal/oil palm hybrid fiber reinforced natural rubber composites,” Composites Sci. Technol., 64, pp 955-965, 2004
- [10]. Poh B.T. and Wong K.W., “Effect of blend ratio on Mooney scorch time of rubber blends,” J. App. Polym. Sci., 69, 1301-1310, 1998

- [11]. Ismail H. and Leong H.C., "Curing characteristics and mechanical properties of natural rubber/chloroprene rubber and epoxidized natural rubber/chloroprene rubber blends," *Polym. Testing*, 20, 509 – 516, 2001.
- [12]. Ramesan M.T., Mathew G., Kuriakose B., and Alex R., "Role of dichlorocarbene modified styrene butadiene rubber in compatibilisation of styrene butadiene rubber and chloroprene rubber blends," *Eur. Polym. J.*, 37, 719 – 728, 2001.
- [13]. Ismail H., and Nordin R., "Effect of Epoxidised Natural Rubber (ENR) and Ethylene co Acrylic Acid (EAA) Copolymer on Properties of Silica Filled Natural Rubber/Recycle Rubber Powder Blends," *Polym. Plast. Technol. Eng.*, 43, 285 – 300, 2004.
- [14]. Poh B.T. and Wong K.W., "Effect of blend ratio on Mooney scorch time of rubber blends," *J. App. Polym. Sci.*, 69, 1301-1310, 1998.
- [15]. Ismail H., and Nordin R., "Effect of Epoxidised Natural Rubber (ENR) and Ethylene co Acrylic Acid (EAA) Copolymer on Properties of Silica Filled Natural Rubber/Recycle Rubber Powder Blends," *Polym. Plast. Technol. Eng.*, 43, 285 – 300, 2004.
- [16]. Johnson T. and Thomas S., "Effect of epoxidation on the transport behavior and mechanical properties of natural rubber," *Polym.* 41, 7511 -7522, 2004.