

Non-isothermal degradation kinetics of filled with rise husk ash polypropene composites

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Received 16 November 2007; accepted in revised form 10 January 2008

Abstract. The thermal stability and kinetics of non-isothermal degradation of polypropene and polypropene composites filled with 20 mass% vigorously grounded and mixed raw rice husks (RRH), black rice husks ash (BRHA), white rice husks ash (WRHA) and Aerosil Degussa (AR) were studied. The calculation procedures of Coats – Redfern, Madhysudanan *et al.*, Tang *et al.*, Wanjun *et al.* and 27 model kinetic equations were used. The kinetics of thermal degradation were found to be best described by kinetic equations of n -th order (F_n mechanism). The kinetic parameters E , A , ΔS^\ddagger , ΔH^\ddagger and ΔG^\ddagger for all the samples studied were calculated. The highest values of n , E and A were obtained for the composites filled with WRHA and AR. A linear dependence between $\ln A$ and E was observed, known also as kinetic compensation effect. The results obtained were considered enough to conclude that the cheap RRH and the products of its thermal degradation BRHA and WRHA, after vigorously grounding and mixing, could successfully be used as fillers for polypropene instead of the much more expensive synthetic material Aerosil to prepare various polypropene composites.

Keywords: *polymer composites, rice husks, thermal properties, non-isothermal degradation, kinetics*
