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BOONLOM THAVORNYUTIKARN: SYNTHESIS OF GRAFT COPOLYMERS OF NATURAL RUBBER AND POLYACRYLONITRILE BY BORANE CHEMISTRY. THESIS ADVISORS: KRISDA SUCHIVA, Ph.D., WANIDA JANVIKUL, Ph.D., PRANEE PHINYOCHEEP, Doctorat de l' Universite' du Maine, 144 p. ISBN 974-664-742-3

A new route to the synthesis of graft copolymers by borane chemistry has been introduced. It is a two-step process, namely hydroboration and autoxidation. The graft copolymerisation procedure is simply performed at room temperature. In the present study, graft copolymers of polydienes, i.e., IR, PNR and NR, and polyacrylonitrile were prepared. The polydienes were first hydroborated by 9-borabicyclononane (9-BBN) in THF, generating boron-containing polymers. These intermediates on the polymeric olefinic sites were converted into hydroxyl groups by reacting with $NaOH/H_2O_2$ reagents to evaluate the efficiency of the hydroboration reactions. Secondly, the graft copolymers of the polydienes and polyacrylonitrile (IR-g-PAN, PNR-g-PAN and NR-g-PAN) were successfully synthesised via the autoxidation of the boron-containing polymers in the presence of acrylonitrile. The percentage of PAN grafted was found to increase as a function of 9-BBN and acrylonitrile concentrations. The evaluation of the grafting polyacrylonitrile chains was attempted by several means. One of them is to use a model compound, 2-methyl-2-butyl-9-BBN, as an initiator in the polymerisation of acrylonitrile to correlate the resulting PAN to the grafting PAN of the copolymers. The effects of some reaction parameters, such as monomer, borane, solvent and oxygen concentrations, on the polymerisation were studied.