

Commercial Polymer Blends

L.A. Utracki



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3 In 1992 the annual world production of plastics reached 102 x 1()6m at a value of 3 over US\$300 billion, while that of steel was 50 x1()6m at a value of US\$125 billion (Table 1. 1). Furthermore, from 1980 to 1990, plastics production increased by 62%, while that of steel decreased by 21%. Considering theunevenpolymerconsumption around theworld, polymerproduction will have to increase by a factor often before currently recorded levels of plastics sales in developed countries willbe universally reached. Polymers are the fastest growing structural materials. In addition, the polymer blend segment of the plastics industry increases at a rate about three times higher than thewhole. The aim of thisbook is to trace the historical evolution of the polymer blends industry. Table 1. 1 World production of steel and plastics for 1992 Production Steel Plastics 410 102* Production volume (Mt/year) 3 Production volume (M(m)/year) 51 102 Production value (billion US\$/year) 125 310 Growth from 1980to 1990 (%) -21 -1;62,. 121 Mt/year in 1996 A polymer (from the Greek poly = manyand meros = units) is a substancecomposed ofmacromolecules builtby covalently joining at least 50 molecular segments, called mel'S. The word polymer was introduced in 1832 by Jons Jacob Berzelius for sub-stances thatmayhaveidenticalchemicalcompositionbutdifferinmolecularweight (e.g., acetylene, benzene and styrene, having the formula CnH with n == 2,6and 8, n respectively). During the years 1859-1863, Louren~o reported that condensation of ethylene glycol with ethylene dibromide resulted in a mixture of ethers, whose members, separated by distillation, were identified as HD-(C214D-)n-H with n==2 to 6 (Stahl, 1981).



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