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MODIFICATION OF NATURAL RUBBER LATEX BY GRAFTING

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Natural rubber latex (NRL) technology has attained an unchallengeable status due to its unique features and industrial importance. However, the presence of unsaturation in the backbone and hydrophobicity limit its use in many outdoor and biological applications. Scientists have developed different strategies to address these drawbacks. One of the main methods being employed for the modification of NRL is graft co-polymerization. By grafting a variety of functional groups can be incorporated into NR structure and thus broaden the application areas. This review covers the characteristics of graft co-polymerization, initiated by high energy radiations and *via* topology controlled seeded emulsion polymerization.

Keywords: Latex modification, Natural rubber latex, Radiation grafting, Redox initiators, Seeded emulsion polymerization

INTRODUCTION

The word latex was originated from Latin language. It means a liquid or fluid of any kind and not something supposed to be a liquid or fluid of milky appearance. However, in early 19th century botanists used the word to denote certain plant juices of milky appearance. It then extended into the general terminology of rubber technologists to denote specifically those plant juices, milky in appearance and from which rubbery substances are obtained. But in modern polymer science and technology, the word is used commonly to denote a stable colloidal dispersion of a polymeric substance in aqueous medium.

The best known plant latex is natural rubber latex (NRL). The tree which is universally accepted producing the best rubber latex is *Hevea brasiliensis*. NRL is harvested from the rubber tree by a process called tapping; cutting the grooves at an angle of 25-30° from the tree. The latex then flows down along the cut segment of tree and falls into small collection cup (Perrella and Gaspari, 2002). Tapping yields about 150-200 ml latex within 3 h (Rose and Steinbuchel, 2005). The latex is a yellowish milky liquid which on coagulation by acid form an elastic solid within 4-6 hours at room temperature (Pichayakorn *et al.*, 2012).

Natural rubber latex, from *H. brasiliensis* is composed primarily of *cis*-polyisoprene as shown in Figure 1a. In addition, two *trans*-isoprene units are present in the terminal region (Tanaka and Sakdapipanich, 2001).

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