

TITLE MODIFICATION OF CALCIUM CARBONATE SURFACE BY POLYISOPRENE FOR IMPROVED COMPATIBILITY WITH NATURAL RUBBER

AUTHOR NARISSARA KITISREEWORAPHAN

DEGREE MASTER OF SCIENCE PROGRAM IN POLYMER SCIENCE AND TECHNOLOGY

FACULTY FACULTY OF SCIENCE

ABSTRACT Calcium carbonate (CaCO_3) is a low-cost inorganic filler commonly used in manufacturing of natural rubber latex products. However, the main problem of CaCO_3 is the incompatibility with and low dispersibility in hydrophobic natural rubber, resulting in a decrease of mechanical properties of CaCO_3 -filled natural rubber products. This problem may be solved by modification of the CaCO_3 surface to reduce its polarity and, hence, to improve its affinity with non-polar rubbers. In this study, the surface of CaCO_3 was modified with polyisoprene using admicellar polymerization. The parameters which influence admicellar polymerization of isoprene on the surface of CaCO_3 were examined. The results of FTIR and TGA testing showed that polyisoprene was successfully formed as an ultra-thin layer on the CaCO_3 surface. The modified CaCO_3 particles also showed increased hydrophobicity. Incorporation of the modified CaCO_3 into natural rubber latex gave dried rubber film with improved mechanical properties. In addition, a lower amount of modified CaCO_3 was required to achieve similar properties compared with the unmodified CaCO_3 .