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Development of non marring glove for coated glass industry

By

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Declaration

The work described in this thesis was carried out by me under the supervision of Dr. Laleen Karunanayake, Senior lecturer in chemistry at University of Sri Jayewardenepura and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree or Diploma.

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25/08/2009

I certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University of Sri Jayewardenepura for the purpose of evaluation for the award of the M.Sc in polymer science and technology.

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Development of non marring glove for coated glass industry

I.M.Sanjeewa Herath

ABSTRACT

There has been an increasing demand for specialty gloves during the last decade. The coated glass industry required a special Natural Rubber (NR) glove which provides cut resistance and abrasion resistance along with non marring features, which means preventing marks on any kind of object surface. Cut and abrasion resistance are required to protect the workers hand from glass and non marring features are required to protect the glass surface from the glove.

The presence of various substances in the latex and compounding ingredients, that migrate on to the glove coating surface is the main cause suspected for leaving marks on the surface of the glass.

After introducing a smooth latex coating and removing unnecessary chemicals, a series of glove samples were developed in various trials.

Industrial latex gloves are produced with rough surface coating to enhance the grip. The purpose of introduction of smooth coating was to avoid the physical impact of rough surface of the glove on the coated glass. There are some additives in the glove formulations to provide additional features such as color, odor which are not necessary for the function of the glove. Such unnecessary chemicals were also removed in this study.

Trials were carried out changing the leaching process, changing the type of NR lattice, introducing deionized (DI) water and adding 2% Hydrochloric acid to the leaching tank, introducing chlorination and introducing post leaching.

Though the formulation is modified removing unnecessary chemicals, migration of materials can not controlled completely. Therefore, the leaching process is introduced changing the temperature and leaching time. Further, leaching trials were carried out with deionized water to minimize the effect of ions in normal water. 2%HCl was introduced to the leaching tank to see whether the water soluble proteins could be removed from the latex which may cause for marring.

Natural latex also contains various substances. These substances migrate on to the glove surface and may cause for marring. There are various types of purified latex in the market which are called clean latex. This latex contains less protein, ions and other materials compared to the natural latex. Several types of clean lattices were used for the study.

Post leaching was also introduced to study the possibility of further improvements.

Introduction of chlorination process for supported gloves was found to introduce the best quality gloves which provide non marring features on the coated glasses.

The most suitable yarn type was selected from the information obtained from the literature survey and the best suitable yarn combination was identified and inner liner was knitted in order to achieve the best cut resistance.