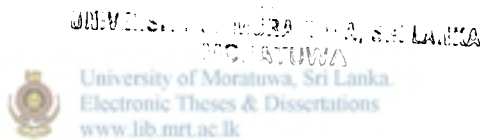


**INCORPORATION OF ACTIVATED CARBON
IN NATURAL RUBBER LATEX FOAM
FOR IMPROVEMENT IN SORPTION PROPERTY**

BY

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**A dissertation submitted as partial fulfillment of the requirements for the
award of the degree of MASTER OF SCIENCE in Polymer Technology,
University of Moratuwa.**

**Department of Chemical and Process Engineering
University of Moratuwa
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May 2006

University of Moratuwa



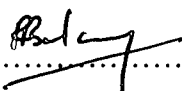
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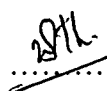
DECLARATION

I certify that this dissertation does not incorporate without any acknowledgement any material previously submitted for a Degree or a Diploma in any University or Institution and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due references are made in the text.


.....

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ACKNOWLEDGEMENT

I wish to express my heartfelt gratitude to Dr. Shantha Walpolage, the Course Coordinator - MSc in Polymer Technology, University of Moratuwa, as well as my project supervisor, for providing me the guidelines and the necessary facilities to carry out this research study. I acknowledge with deepest gratitude for his constant guidance, timely advice and consultative encouragement extended to me throughout the study.

I am indebted to my employer, Mr. Rohana Silva, former General Manager - Richard Pieris Natural Foams Ltd, Biyagama and Arpico Natural Latexfoams Ltd, Avissawella, sanctioning me leave and providing facilities to follow the MSc in Polymer Technology course.

I owe a sense of gratitude to Mr. Wasantha Abeysirigunawardena, General Manager - Group Research and Development, R&D Centre, Richard Pieris and Company, for providing me the opportunity to carry out this research study successfully and backing me up with advice, suggestions and assistance whenever I needed.

My sincere thanks should also go to Manjula, Susantha and Chandika at Arpico Natural Latexfoams Ltd for their kind assistance given to me to carry out laboratory testing and experimental work. I would also like to thank Lelwela, Indika and the technical staff of R&D Centre, who helped me in many ways.

I wish to record my sincere appreciation for the assistance given by Mr. Sisira de Silva, Mr. Hemachandra and the technical staff of Latex laboratory of Chemical and Process Engineering department, University of Moratuwa.

I wish to thank J.B Activators, Silvermill Group and Heycarb International for providing me with samples of activated carbon free of charge to carry out this study.

Last but not least, I would like to dedicate a very special word of thanks to my late father, my mother, my husband Rasika and my parents-in-law for being with me throughout the study.

ABSTRACT

Natural Rubber (NR) latex is a colloidal dispersion of NR polymer which is predominantly cis 1,4 -Polyisoprene in an aqueous medium. Various chemicals are added to NR latex mainly as dispersions, at compounding stage to enhance processing characteristics and to obtain desired properties of the final product. The properties of chemicals in dry form or as dispersions are critical for latex compounding for maintaining the overall colloidal stability of the latex mix. Addition of chemical dispersions into latex for compounding are basically governed by particle or droplet size, physical nature, viscosity, pH and stability of the dispersion. Hence, properties of raw materials (compounding chemicals) are very important for making good dispersions for latex compounding and producing desired latex products.

In this study, an attempt was made to use activated carbon as a compounding ingredient to enhance the sorption properties of NR latex foam product. From this study it was found that activated carbon powder which had particle size below 10μ and pH (in 1% solution) having a basic pH or a pH towards neutrality can be made to a stable dispersion of 36% Total Solids Content by ball milling for 18 hours in the presence of a dispersing agent. This dispersion had proper dispersion characteristics such as low particle size (3μ), a pH greater than 7 and low viscosity value. From mechanical and chemical stability studies on latex compound, it was found that up to 2.0% (on dry weight of latex) of activated carbon, the latex compound had good mechanical and chemical stability. At 2.0% activated carbon, the cellular structure of the foam was satisfactory. From physical property testing of foam with activated carbon on compression set and tensile strength, it was found that good foam properties were obtained with the chemical formula for optimum vulcanizing condition consisting of phr 2.55 Sulphur, 1.10 ZDC and 0.85 ZMBT.

The results of sorption property investigations of this study reveal that NR latex foam with 2.0% activated carbon has a significantly higher sorption property compared to standard NR latex foam. Therefore, activated carbon can be incorporated to a NR latex compound in dispersion form at 2.0% dosage to produce a latex foam pillow having higher sorption property.

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LIST OF ABBREVIATIONS

NR	-	Natural Rubber
AC	-	Activated Carbon
T.S.C	-	Total Solids Content
S	-	Sulphur
ZDC	-	Zinc diethyl dithiocarbamate
ZMBT	-	Zinc mercaptobenzothiozole
ZnO	-	Zinc Oxide
SSF	-	Soldium Silico Fluoride
KCl	-	Potassium Chloride
DPG	-	Diphenylguanidine
Ralox	-	A sterically hindered phenolic type antioxidant which is a butylated reaction product of p-cresol and dicyclopentadiene
FS 4	-	A non ionic foam stabilizer
CaCO ₃	-	Calcium carbonate
NH ₃	-	Ammonia

