

**EFFECT OF PRINT SCREEN INK ON PROPERTIES OF
RE -EXTRUDED HIGH DENSITY POLYETHYLENE (HDPE)**



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บทคัดย่อ

จุฑามาศ นันทิทรรก : ผลกระทบของหมึกพิมพ์ต่อสมบัติของโพลีเอททีลีนชนิดความหนาแน่นสูงที่ผ่านกระบวนการผลิตซ้ำ (Effect of Print Screen Ink on properties of Re-Extruded High Density Polyethylene (HDPE)) อ. ที่ปรึกษา : ศ. จอห์น เอฟ สแกมฮอร์น (Prof. John F. Scamehorn) และ ดร. พิชญ์ สุภผล 56 หน้า ISBN 974-13-0713-6

โพลีเอททีลีนชนิดความหนาแน่นสูงเป็นพลาสติกที่มีนิยมนำมาใช้แพร่หลาย แต่การบริโภคพลาสติกชนิดนี้จำนวนมาก ก่อให้เกิดผลกระทบจากขยะที่ใช้แล้วของผลิตภัณฑ์ที่เพิ่มขึ้นด้วย การนำพลาสติกชนิดนี้กลับมาใช้ใหม่สามารถลดปัญหานี้ลงได้ แต่คุณภาพของผลิตภัณฑ์ที่ได้จากการนำพลาสติกมาหลอมใช้ใหม่นั้น ไม่สามารถเทียบกับผลิตภัณฑ์ที่ได้จากพลาสติกที่ยังไม่ได้ผ่านกระบวนการผลิตมาก่อน สาเหตุสำคัญคือมีสิ่งเจือปนในพลาสติกที่นำกลับมาใช้ใหม่ เช่น หมึกพิมพ์ที่พิมพ์ลงบนผิวพลาสติก วัตถุประสงค์ของงานวิจัยนี้คือ ศึกษาผลกระทบที่เกิดจากหมึกพิมพ์ที่ปนเปื้อนมากับโพลีเอททีลีนชนิดความหนาแน่นสูง ต่อสมบัติทางความร้อน สมบัติเชิงกล และสมบัติของสีของพลาสติกที่ผ่านกระบวนการอัดรีดซ้ำ พลาสติกที่ใช้ในการทดลองผ่านการแยกหมึกออกที่ระดับการแยกต่างๆ โดยใช้สารลดแรงตึงผิวที่มีขั้วบวก ในงานวิจัยนี้ใช้สารซิติวไตรเมททิลแอมโมเนียมโบรไมด์ในการแยกหมึกจากผิวชิ้นงาน จากการทดลองพบว่าหมึกพิมพ์ไม่ทำให้เกิดการเปลี่ยนแปลงที่สังเกตได้ชัดเจนในด้านสมบัติเชิงกล และสมบัติทางความร้อนของพลาสติก แต่ก่อให้เกิดการเปลี่ยนแปลงสมบัติด้านโครงสร้างผลึกและสีของพลาสติกอย่างชัดเจน

ABSTRACT

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Ms. Chuthamas Nandidarbha: Effect of Print Screen Ink on
properties of Re-Extruded High Density Polyethylene(HDPE)

Thesis Advisors: Prof. John F. Scamehorn and Dr. Pitt

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HDPE is widely used and its consumption has increased continually: this translates into a large amount of solid waste produced. Recycling of such a waste has been perceived as a means for dealing with this environmental problem. It is however easier said than done, since properties of recycled HDPE articles are inferior to those produced from virgin resins. The worsening of the properties is a result of the included contaminants. One of the contaminants is the ink used in printing HDPE bottles. The main objective of this work is to study the effect of residual ink on the color characteristics, thermal and mechanical properties of re-extruded HDPE articles. A cationic surfactant, cetyltrimethylammonium bromide, was used to prepare samples with different degrees deinking: namely, 50% and 100%, respectively. The results showed that the presence of small amounts of residual ink had no significant effect on thermal and mechanical properties of re-extruded HDPE. However, presence of residual ink affected the color characteristics and the percent of crystallinity of re-extruded HDPE.

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