

**STUDYING THE INTERACTIONS OF IONIC LIQUIDS
AND BLENDED FABRICS**

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Degree of Master of Engineering in Environment Engineering and
Management

Department of Civil Engineering

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ABSTRACT

Textile waste is a huge contributor of solid wastes piling up in landfills every second around the world. It has been a challenge over decades to recycle textile waste due to reasons including high durability of the materials and difficulty in sorting.

Blended fabrics are a category that contributes for solid wastes that are difficult to be recycled due to combined properties of different fabric types used. Spandex is one such blending yarn type often combined with fabrics to enhance stretchability and elastic recoverability. It is a synthetic fiber with segmented polyurethane with superior elasticity, durability and shape retention. It has more durability and elasticity than natural rubber. Spandex is commonly used in sportswear, lingerie, swim wear and leisurewear. Spandex has an exceptional elasticity due to alternating rigid and flexible segments. Composites of polyester-spandex, nylon-spandex and cotton-spandex are commonly used in garment industry. The spandex percentage ranges from about 5% to 40%. There is a high tendency of landfilling Spandex blended fabrics because highly elastic fibers have totally different characteristics than other fibers which make them difficult to be recycled (Langley and Kim, 2006).

Even though there are few studies focused on recycling of Spandex fabric blends, hardly any study is available on recycling of spandex -polyester blends and spandex-cotton blends. This study was aimed to see the possibility of selectively dissolving spandex in an ionic liquid and recovering polyester and cotton in pure form. Recovered polyester can be used to make polyester yarns, bottles etc. Regenerated cotton can be used to produce cotton yarns. The study will initially be focused on ionic liquids as those are environmentally friendly since they can be used as solvents at room temperature.

The experiments were carried out and found out that the polyester + spandex fabric and cotton + spandex fabric does not show any significant change after dissolution.

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LIST OF ABBREVIATIONS

IL – Ionic Liquid

AMIMCl - 1-Allyl-3-methylimidazolium chloride

BMIMCl - 1-Butyl-3-methylimidazolium chloride

MMT – Million Metric Tons