

Research Title	Development of Flame Retardant Textiles for Use in Industry
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Abstract

This research aims to develop flame retardant textiles by using nano silicon substance extracted from rice straw and rice husk by extracting and burning process and based techniques. Then make the silicon particles are nano-sized by reflux and grinding techniques. The extracted nano silicon is then decorated on cotton and silk by means of dipping, compression, drying. The fire retardant test found that cotton fabrics decorated with 0.6, 0.4 and 0.2 mg/ml nano silicon and cotton do not decorate substances with the ability to resistant to starting a fire of 6.925, 4.925, 2.95 and 1.125 seconds, respectively. The burning of fire were 77.925, 61.925, 42.95 and 36.125 seconds respectively. The melting to fire were 10.925, 7.925, 4.95 and 2.125 seconds respectively. The red when exposed to fire were 78.925, 62.925, 43.95 and 37.125 seconds, respectively. It can be seen that the cotton fabric decorated with 0.6 mg/ml nano silicon has the best fire retardant properties which is different from fabric decorated with nano silicon at a concentration of 0.2, 0.4 mg/ml and undecorate cotton with statistical significance ($p < 0.05$). The decorated silk with nano-silicon after the fire retardant testing, it was found that decorated silk with nano silicon at concentrations of 0.6, 0.4 and 0.2 mg/ml and undecorate silk with the ability to resistant to starting a fire of 1.942, 1.760, 1.360 and 1.242 seconds, respectively. The melting to fire were 4.306, 5.618, 6.572 and 7.948 seconds, respectively. The red when exposed to fire were 0.602, 0.733, 0.910 and 1.620 seconds respectively. The burning of fire were 1.606, 1.865, 1.932 and 2.034 seconds, respectively. It can be seen that the silk decorated with nano silicon concentration 0.6 mg/ml has the best fire retardant properties which is different from silk that decorated with nano silicon at a concentration of 0.4, 0.2 mg/ml and undecorated silk with statistical significance ($p < 0.05$). Also found that undecorate silk and decorated silk had the average UVA protection values were 98.411% and 99.707%, respectively. The average UVB protection values were 98.427% and 99.727%, respectively. It can be seen that the silk that has been decorated with nano-zinc oxide has increased UV protection when compared with undecorated silk, statistically significant at the level of 0.05.