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Introduction

Workers' hands are at the highest risk of being affected by harmful factors in the work environment and upper limb injury is the most widespread type of workplace accident occurring during the performance of manual tasks.

One way of preventing hand injury is the use of gloves that are fit for purpose in protective. The design of protective devices is becoming an increasingly complex process requiring interdisciplinary knowledge in terms of both product development and assessment, going beyond the prescribed standards.

The protective properties of glove materials may be improved by continuous or spot coating with polymeric materials such as poly(vinyl chloride), polyurethane, silicone, and natural or nitrile rubber [1].

Materials and methods

The objective of the work was to evaluate the effects of different size of particles added to a polymer material [3].

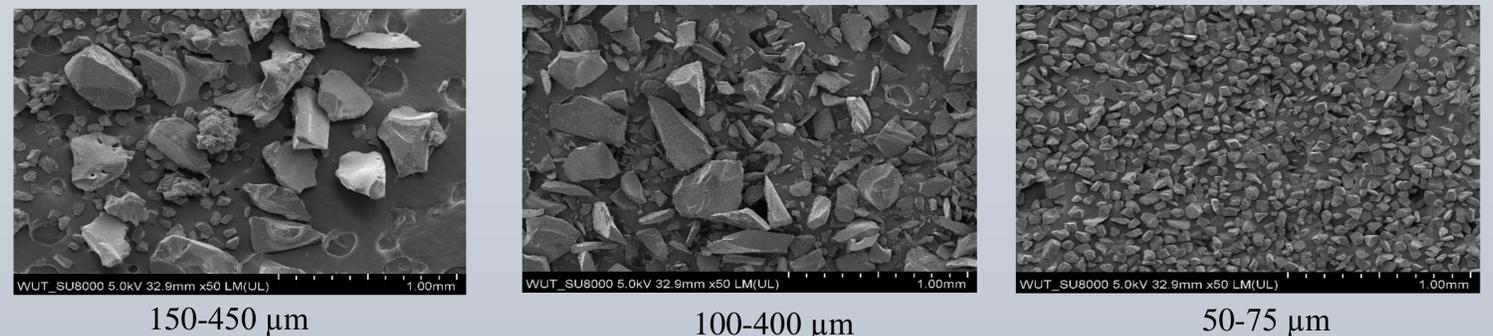


Fig. 1. Scanning electron microscope images of SiC particles

Knitted aramid textile samples were coated in laboratory conditions using a polymer paste that was functionalized with silicon carbide (SiC) reinforcing particles of three different size fractions.

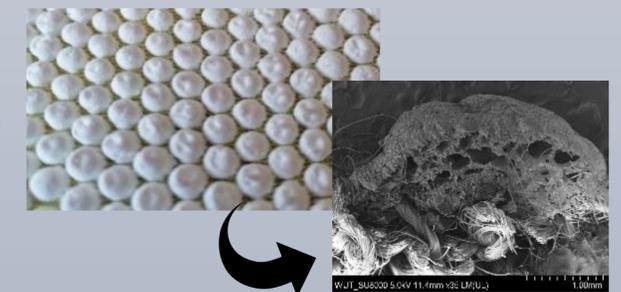
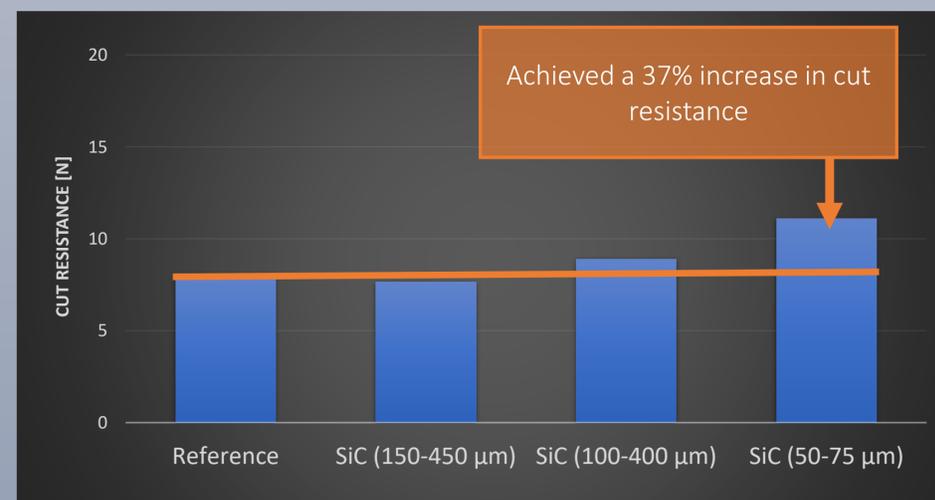


Fig. 2. Real and scanning electron microscope images of sample

Results and conclusions

The studied variants of knitted fabric functionalized with composite layers exhibited cut resistance corresponding to performance levels B and C. Figure 3 presents the results of cut resistance tests for the test textile carrier functionalized with composite coatings.



The greatest increases in cut resistance were found for SiC (53–75 μm), which was the smallest size of particles. Particle size was found to affect the porous microstructure of the polymer paste and cut resistance properties.

Acknowledgements

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Literature:

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