

UVfor3D

3D printing with UV curable systems for bandages

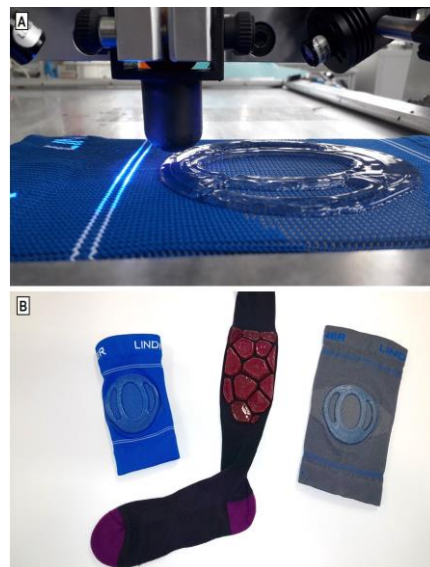
Motivation

Bandages are among the aids, i.e. material resources, that are provided by health insurance companies as part of a treatment. They have a compressing and/or function-securing effect on a treated part of the body, e. g. elbow, knee or ankle. In addition to the advantages of medical use, bandages are also used for prevention during sporting activities. Bandages are made of elastic materials or knitted fabrics and are usually supplemented with a molded part that has previously been produced. The molded part is integrated by gluing, welding or sewing processes, which lead to unwanted seams and pressure points. Several time-consuming and costly process steps are therefore necessary for the production of the bandages.

The aim of the research project was the development of a novel process combination of dispenser 3D printing and UV LED curing for the digital partial functionalization of textiles using the example of bandages for the sports and medical sectors.

Experimental

The solution of the project included the development of the UV curable formulations and the realization of the simultaneous printing and curing process. A urethane acrylate-based formulation and a silicone formulation were developed as part of the project. Both could be printed on various knitted fabrics (polyester and polyamide-elastane mixture) using dispensers and simultaneously cured with UV LED spotlights. Various additives (antimicrobial agents and pigments) were successfully incorporated into both formulations without negatively affecting printability or UV crosslinking.



A) 3D printing with simultaneous UV curing
B) project demonstrators

Results

The formulations developed were used to produce prints that were strongly adhering, kink resistant, abrasion-resistant and washable. As project demonstrators, circular knitted blanks (polyamide-elastane mixture) were printed and thus knee bandages with patella ring and shin guards were produced. The process combination of 3D printing technology and UV LED curing enables the customized functionalization of textiles, e. g. for the production of bandages in sports and medicine. This technology combination offers the potential to drastically reduce set-up times for the systems, since the pattern change is only digital and therefore no templates/tools have to be changed or manufactured.

Acknowledgement

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