

UVfor3D – 3D printing with UV curable systems for bandages

Objective

Bandages are one of the aids provided by health insurance companies as part of treatment. They have a compressive and/or function-securing effect on a treated body part, such as the elbow, knee or ankle. In addition to the benefits of medical application, supports are also used for prevention during sporting activities. They consist of knitted fabrics and are usually supplemented with a moulded part that has previously been injection moulded. The moulded part is integrated using gluing, welding or sewing processes, which lead to unwanted seams and pressure points. Production is therefore time-consuming and cost-intensive.

The aim of the research project was the development of a novel process combination of dispenser 3D printing and UV LED cross-linking for the digital partial functionalisation of textiles using the example of bandages for the sports and medical sector.

Approach and results

The project comprised the development of UV-curable formulations and the realisation of simultaneous printing and curing processes. 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.

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 customised functionalisation 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.



3D printing with simultaneous UV curing (l.), project demonstrators (r.)

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The final report on this project is available on request.

Contact: Dr. rer. nat. Ralf Lungwitz Phone: +49 371 5274-248 Email: ralf.lungwitz@stfi.de
Dr.-Ing. Sarah Lysann Zedler Phone: +49 371 5274-266 Email: sarah.lysann.zedler@stfi.de

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