

FORMULATION OF HYDROGEL INKS FOR ADDITIVE MANUFACTURING

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Additive manufacturing and 3D printing techniques are of special interest for the fabrication of prototypes, of highly complex geometries and of individual 3D constructs. In order to utilize the advantages of 3D printing for the fabrication of spatially defined hydrogels, different techniques like inkjet printing^[1] or 3D dispensing^[2] can be used. The different available techniques impose their individual constraints on *e.g.* the flow behavior of the processed hydrogel inks.

In this contribution, we present the development of hydrogel formulations with optimized viscosities and gelling properties for 3D dispensing and inkjet printing. For this purpose, chemically modified derivatives of the synthetic polymer poly(ethylene glycol) as well as of the bio-based polymer gelatin were used. The crucial rheological properties of the formulations were optimized either by adjusting the chemical modification or by using suitable additives. As a result, spatially well-defined hydrogels with various shapes were obtained. Our results give rise to the conclusion that additive manufacturing is a powerful tool for the fabrication of functional hydrogels with geometries which cannot be achieved with other methods.

[1] Hoch, E.; Hirth, T.; Tovar, G.E.M.; Borchers, K., *J. Mater. Chem. B* 2013, *1*, 5675-5685.

[2] Kraut, G.; Yenchsky, L.; Prieto, F.; Tovar, G.E.M.; Southan, A., *J. Appl. Polym. Sci.* 2017, DOI: 10.1002/APP.45083.