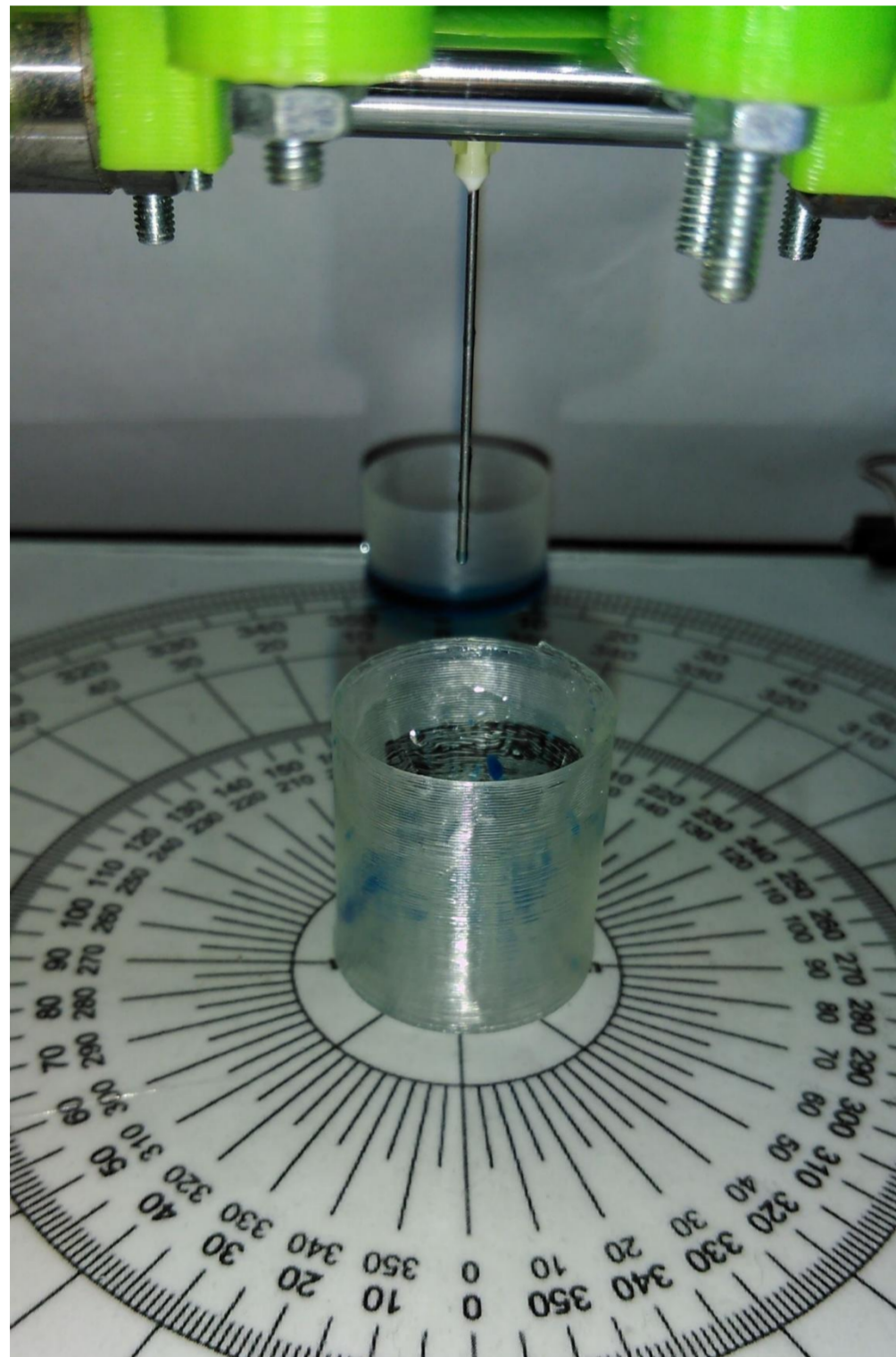


# Innovative 3D printing system in suspensions of ultrasound gels and other transparent substances, based on monomers catalyzed by UV rays

## Introduction

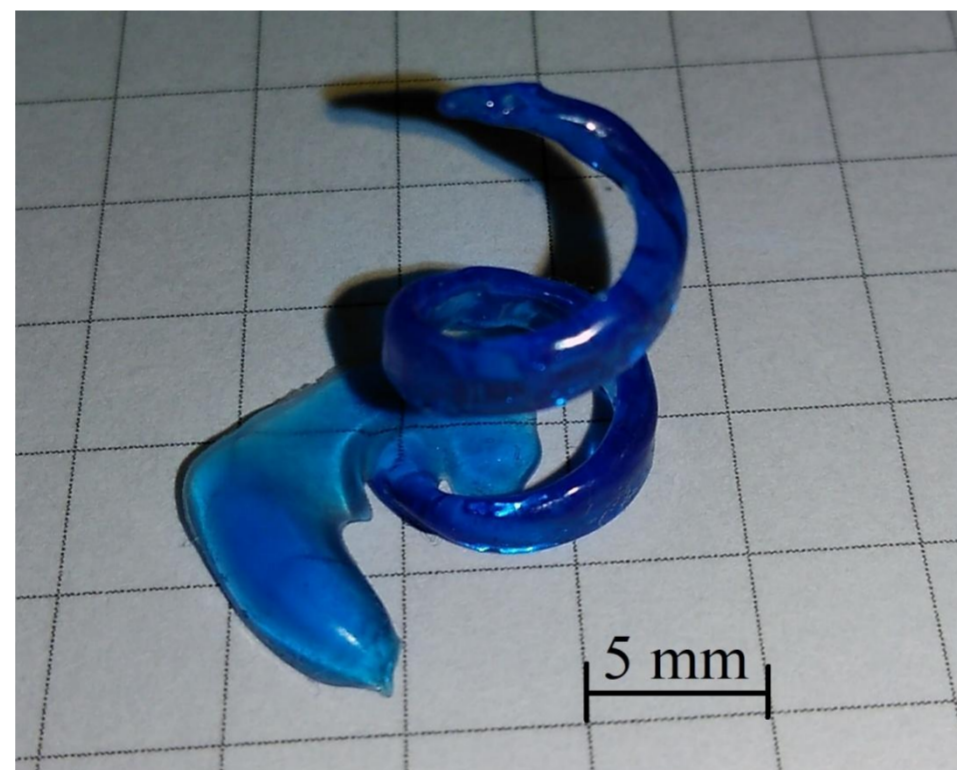
Printing technologies currently available on the market, such as SLA or PolyJet are problematic in terms of removing supports during cleaning of the print. It is important especially when printing complex, small, openwork elements. The proposed solution is characterized by the so-called soft, easy to remove support, in the form of suspension, e.g. like a commonly available ultrasound gel.



printer executive part



print before and after optimization of control parameters



3D printing - zoom

## Technical Advantages

The advantages of the proposed method include:

- ❑ elimination of the cumbersome support system by using the so-called soft support,
- ❑ possibility of quick and low-cost printing of delicate and complex structures,
- ❑ use of inexpensive, generally available and chemically safe materials, like ultrasound gels or hydrogels,
- ❑ elimination of the participation of high-energy sources during printing and subsequent curing,
- ❑ use of monomer and catalysis with UV rays in the curing process,
- ❑ high precision, the ability to reproduce small and delicate shapes.



small test chamber for UV catalysis

## Main concept

The basis of the printing system is a numerically controlled printer with a variable working area, in which base chambers are filled with a gel suspension, and then the monomer is placed in a controlled process. A uniform structure of the 3D printout is obtained after a sufficiently long exposure to UV radiation, which also affects the hardness / elasticity of the resulting polymer. The method allows to reproduce precisely complex ones and delicate structures, such as anatomical fragments (blood vessels), and the materials used are biocompatible and can be used for medical applications.

## Application

The innovative 3D printing system is designed to create openwork structures (including porous ones), with complicated geometry, which makes printing difficult with other methods using classical support. Printing from the presented method can be used to create and visualize medical, technical, artistic and other objects. The smooth surface of the printout, obtained directly after 3D printing, can be widely used in technology, medicine and industry.

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