



УНИВЕРЗИТЕТ У НОВОМ САДУ
UNIVERSITY OF NOVI SAD

TOP ACHIEVEMENTS 2021

FACULTY OF TECHNICAL SCIENCES

M92 – registered PATENT at the national level

"Multilayer microfluidic inductor"

National patent

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Multilayer microfluidic inductor As it is known in classical electrical engineering or electronics, there are 4 basic or basic electronic components and they are: resistor (R), capacitor (C), inductor (L) and memristor (M). However, in classical or conventional electronics, the method of making or manufacturing these components has not changed over the years. These components were mostly made of solid materials, which gave them a certain weight. In the past few years, the field of microfluidics has experienced a huge momentum in its development. However, in order for this area to develop rapidly, it is necessary to realize the above four basic components in the world of microfluidics.

The invention solves the above-mentioned problem of making electronic components from solid materials and proposes the realization of a microfluidic inductor whose core is made of technical magnetic material or ferrofluid, which is then small fatty components.

The invention relates to the production of a microfluidic inducer or solenoide by xurography and increasing the inductance of this component by injecting liquid magnetic material or ferrofluid in a channel located on the surface from which the sheets are bent and located.

The invention is based on making inductors from gold conductive segments on the basis of PVC (polyvinyl chloride) foils, filling channels which will represent the core of this inductor and on the basis of forming the upper layer of conductors new structures are formed to form the formed layers. The solenoid is used because it has the highest inductance in order with other structures, because it is most often a coupling between individual windings. The whole process of realization is based on a cheap xurographic technique (kurographi technique) which enables the stacking of multilayer structures and then their lamination at elevated temperature to obtain a compact electronic component. The inductance of the inductor realized in this way is increased by inserting technical magnetic material or ferrofluid into the microfluidic channel, which represents the greatest innovation of the invention with the realization of windings of thin sheets.



The application of xurography is a cheap technique of prototyping in microfluidic electronics. It is based on a computer-controlled plotter (cutter) that contains a small sharp knife that cuts individual PVC foils in the desired geometric shape. Individually cut foils actually represent individual layers, multilayer structures that will be formed as a compact or unique component by passing through a device called a laminator which activates the adhesive layer of the foil at elevated temperature and pressure, which is thus joined together (blind). Conventionally, this technique is used for precise cutting of foil and their joint stacking. Our proposed innovation for the first time combines gold sheets to be glued to foils and to be cut, and then joined in the desired shape, in our invention stacking in the middle of which was the channel used through whose layer is used through the channel which was used. injected technical magnetic material, ferrofluid. The whole technique involves making inductors in a fast period of time (less than 15 minutes) and in conditions that do not require a clean room and the use of expensive and sophisticated factory techniques.