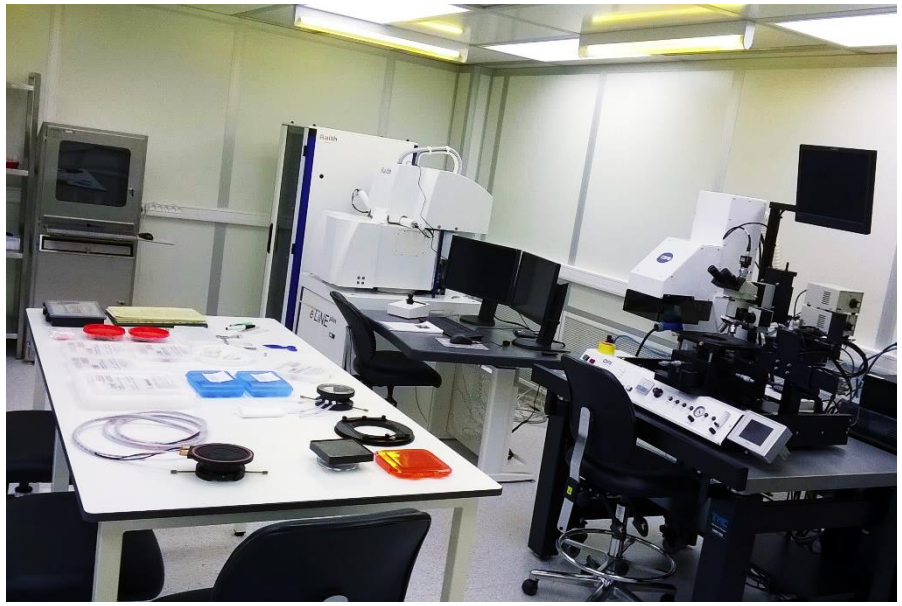

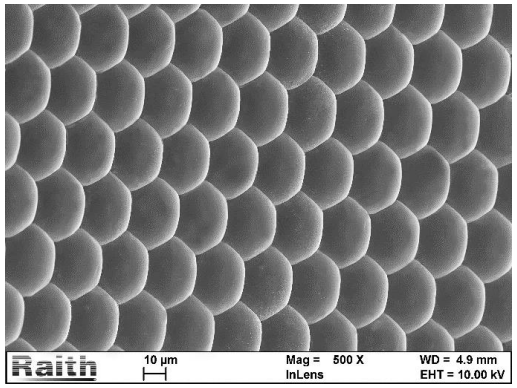

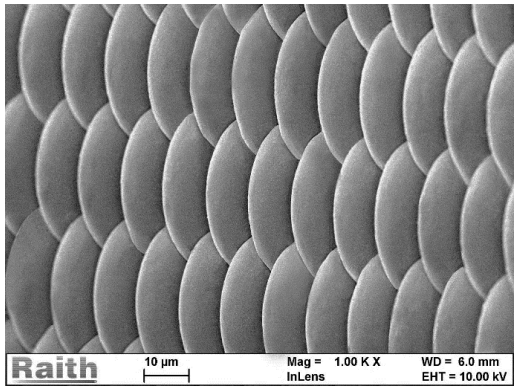

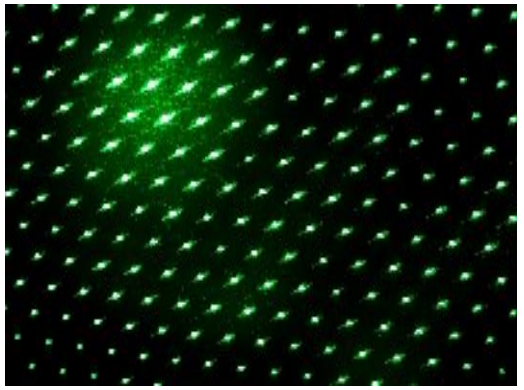

Microlens fabrication technology

Application areas
mobile phones, digital projectors, light emitting diodes

Year of invention
2016

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Features, technical specifications, novelty
Microlenses are widely used in mobile phones, digital projectors, light emitting diodes, etc. In this work, the microlenses were fabricated on a fused silica substrates using a dose modulated 3D electron beam lithography combined with thermal reflow technique. It was shown, that profile shape of the “step-wise” patterned and reflowed microlens is strongly dependent on exposure dose. We found that a greater nominal 3D exposure dose is providing more precise reproduction of the microlens shape. Microlens array was transferred into fused silica substrate using CF_4/O_2 reactive ion etching. It was shown, that etching rate of PMMA is dependent on the plasma etching time and has tendency to decrease, so resulting shape of transferred 3D profile could be different from the shape in PMMA and this variation must be assessed during the microlens design phase. A novel microlens array fabrication technology using optical lithography and thermal reflow technique was implemented in this project. The influence of substrate wettability and reflow conditions on the shape, lateral dimensions and optical properties of plano-convex microlenses was determined.

Technological readiness level
A prototype (undergoing research).

What are we looking for in this stage of development?
Funding for further research and completion of the prototype; R&D orders related to the invention; partners from scientific institutions for joint research.

Patenting
Patentability analysis required.

Commercialisation
To order product, contact:
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Alternatives
Laser direct writing (LDW), gray-scale lithography, proton-beam lithography, focused ion beam technique, nanoimprint lithography.