Development of a microfluidic micro motor based on vibration-induced rotation flow in a fluid.

The bachelor thesis is about a micro-motor development based on vibration-induced rotation flow in a fluid. Micro-motor is presented as a microstructure consisting of four pillars and a hexagon ring made of glass micro-spheres. The rotational velocity of the fluid which rotates the hexagon is obtained by external vibrations induced by a fixed coin motor. The thesis explains the theory calculations of the micro-motor design, van der Waals and capillary forces which were necessary to build the microstructures. For fixation of the microstructures a UV glue was used, which demanded to use also electrostatic force in the process of gluing. The results proved the vibration-induced rotation flow around pillars which causes controllable rotation of small objects, hence carefully designed pillars enabled equilibrium flow inside for micro rotor rotation. Different rotor microstructures were tested using various induced vibrations, by single motor (x-y) or two perpendicularly mounted motors to vibrate in two directions (x-y, x-z).

Microfluidics, vibrations, micromotor, van der Waals force, capillary force.