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Pt Metallization of Laser Transformed Medical Grade Silicone Rubber: Towards a New Miniaturized Nerve Electrode Fabrication Process.

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ABSTRACT OF THE TALK

Chronic nerve recording and stimulation became possible through the use of implanted electrodes cuffs. In particular, self sizing spiral electrode cuffs limit mechanical damage to the tissue: these have been shown to be suitable for long term implantation in animal and in man. However up to now, such electrode cuffs were handmade and were hardly reproducible. They possessed a small number of electrodes (dot contacts), each being linked to its own wire. In order to improve the selectivity of nerve recording and/or stimulation (functional electrical stimulation (FES)), the numbers of electrodes and tracks have to be increased within the same electrode cuff surface. To fulfil this requirement, we have developed a fabrication process that uses a UV laser to induce surface modification, which activates the silicone rubber, and is used with a mask to give high definition tracks and electrodes. After this primary step, silicone rubber is immersed in a Pt autocatalytic bath leading to a selective Pt metallization of the laser activated tracks and electrodes. I will report our process as well as results on PDMS laser irradiation and on Pt metallization , including its morphology, how the DC resistance of Pt tracks depends on the laser used and the irradiation conditions. I will describe the electrical resistance of Pt tracks submitted to Scotch tape tests or to imposed strains or to immersion in a physiological medium.