MECHNO-ELECTRICAL BEHAVIOR OF CARBON NANOTUBE COATED POROUS STRUCTURE

Won Seok Chang[a], Hye-Mi So[b]

[a]Dept. Nanomechanics, Korea Institute of Machinery and Materials, 171 Jang-dong Yusoeng-gu Daejeon ,Korea, paul@kimm.re.kr
[b]Dept. Nanomechanics, Korea Institute of Machinery and Materials, 171 Jang-dong Yusoeng-gu Daejeon ,Korea, hmso@kimm.re.kr

ABSTRACT

Porous conductors with large surface-volume ratios have been applied to a variety of fields including absorbents, flexible heaters, and electrodes for super capacitors. We implemented sensitive pressure sensors using the dynamic and electric characteristics of conductive porous structures. We manufactured conductive porous particles by immersing sponges into a carbon nanotube solution and then measuring the change in resistance. When pressure was applied to conductive sponges, carbon nanotubes were attached to each other and resistance was reduced by up to 20%. Carbon nanotube sponges that were soft and had superior elasticity quickly stabilized without any changes taking place in their shape and they showed constant change in resistance during experiments of repetitive pressure. The pressure devices of sponges were connected to SWCNT-FETs and changes in their characteristics were investigated according to external pressure. Adjusting the contact resistance of sponges and transistors makes it possible to implement arrays of pressure sensors that can process on-board signals.

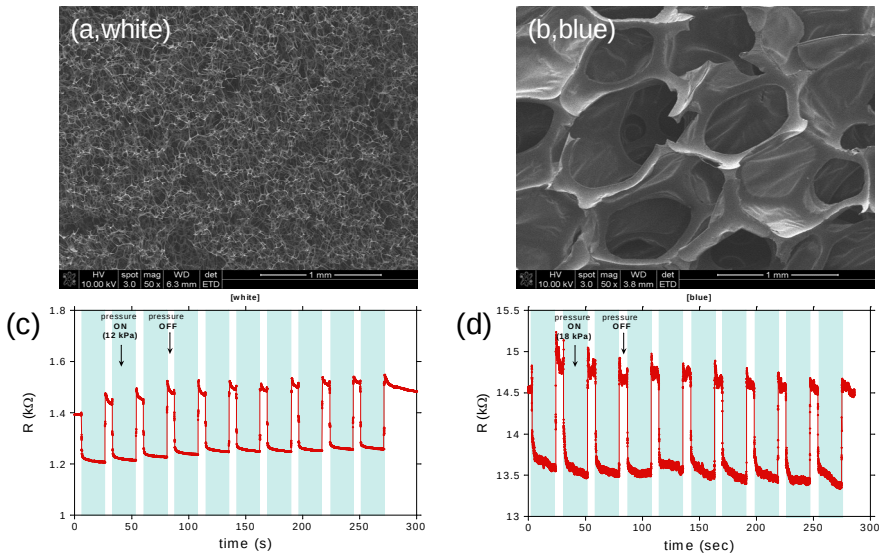

Fig. 1: SEM image of sponge (a) white (b) blue. (c, d) pressure response of white and blue sponge, respectively.

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