

NANO HIGHLIGHT

Nano-Composite Metal Oxides for Electronic Noses

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PIs: Pelagia Gouma, Fu-Pen Chiang, Sanford R. Simon and Michael Dudley
State University of New York at Stony Brook, Stony Brook, NY, 11794-2275

Nanofabricated Electrospun Bio-mimicking Scaffolds: Extracellular matrix (ECM) is a natural scaffold for cell, tissue and organ growth. The topology of ECM controls cells differentiation. There is an engineering design challenge to fabricate nano-composites that mimic ECM's 3D-structures with defined shapes and complex porous architecture. Urinary Bladder Matrix (UBM) was used in our work as the model system of the ECM architecture. Cellulose Acetate (CA) is the biomaterial of choice for building the UBM-mimicking scaffolds from. Electrospinning is the fabrication method we used and adapted to manufacture complex, porous, 3D structures with specific design, in a single step process. Figure 1 (left) shows a scanning electron micrograph of the cross sectional view of the UBM specimen. A dense basal layer, followed by a multilayered (3-layer) cellular-type structure with flattened, elongated, ellipsoidal-shaped pockets, topped by a non-uniformly, loosely shaped fibrous layer are observed. Figure 1 (right) shows the SEM image of nano-manufactured UBM- mimicking scaffold. Although only one middle layer is shown here, the structural features are consistent with the UBM's.

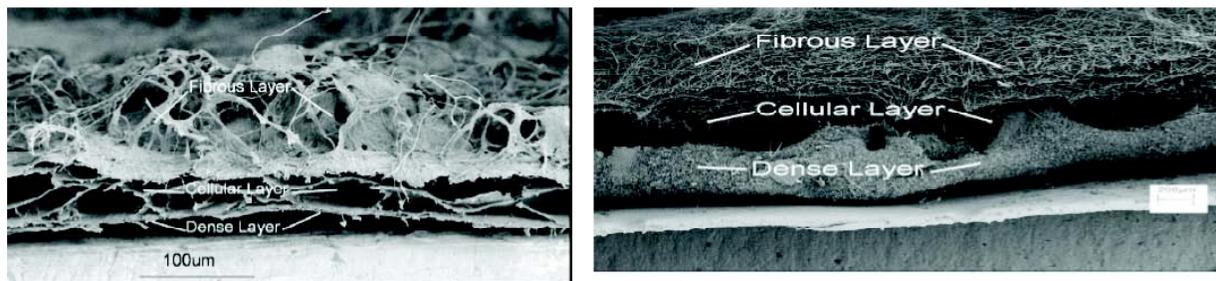


Figure 1: Left: Morphology of the Urinary Bladder Matrix (UBM) structure; Right: Electrospun scaffold that mimics the topology of UBM.

The fact that such structures may be fabricated in a single step process that transcends from the nanoscale fibrous features to the macroscale configuration using minimal patterning that does not disrupt the manufacturing process is an innovation that will be welcomed by the bio-/nanotechnologists. This is the first reported effort of using a single technique to control both the scaffolds architecture and chemistry.

References

- [1] For further information about this project link to < <http://www.matscieng.sunysb.edu/gouma/NIRT>> or email <pgouma@notes.cc.sunysb.edu>
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