**Design of hierarchical electrocatalytic mediator for one step, selective screening of biomolecules in biological fluid samples**

Active electrocatalytic electrode designs are needed for the sensitive and selective detection of a single or multi-active biomolecule among biological components. We report the design of hierarchical NiO catalyst (HNC) for one-step monitoring of bioactive molecules such as ascorbic acid (AA), dopamine (DA), and uric acid (UA). The novel mesostructured geometries, active surface sites, and multi-diffused spaces for easy electron movement through gaps provide highly active electrocatalytic electrode designing surface. Controlled HNC architecture along electrode-design surface domains having double-head branches spread out along both sides of the dipole-like rod may lead to the vital electron transfer and fast response signaling of multi-bioactive molecules in one-shot triggering individually or simultaneously. Electrochemical analyses showed evidence that the proposed electrode design can detect each component up to 0.02 µM. Sensitive detection up to 1.127, 0.02, and 0.978 µM and wide-range responses of 25–800, 2–60, and 10–000 µM for AA, DA, and UA, respectively, were observed. The simultaneous monitoring and selective signaling of AA, DA, and UA in real urine samples in one step under different potentials were realized. Thus, the HNC-modified electrode can monitor and evaluate the coexistence of biomolecules simultaneously in multi-components.