

**Paper test strip for colorimetric cholesterol detection based on self color-changing property of nanoceria**

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Cerium oxide nanoparticles (nanoceria) have gathered much interest for constructing colorimetric assays owing to their unique self-color changing property, that is triggered by H<sub>2</sub>O<sub>2</sub> without any dye. Herein, we developed a paper strip with immobilized nanoceria and cholesterol oxidase (ChOx) for conveniently detecting cholesterol without the requirement of any spectrophotometer or chromogenic substrate. The construction of the cholesterol test strip begins with physical adsorption of nanoceria on the paper surface, followed by ChOx immobilization via silanization, chitosan-mediated activation, and glutaraldehyde treatment of the nanoceria-embedded paper matrices. In the presence of cholesterol, ChOx immobilized on the paper strip catalyzes its oxidation to yield H<sub>2</sub>O<sub>2</sub>, which further induces vivid color transition of the nanoceria-embedded paper from white into intense yellow, which was directly acquired by a conventional smartphone and analyzed with the ImageJ software. Using this strategy, target cholesterol was quantified with excellent specificity and sensitivity under neutral pH conditions, which is appropriate to measure the serum cholesterol.