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Development of paper-based electrochemical sensors for water quality monitoring

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ABSTRACT:

We present a method for the development of paper-based electrochemical sensors for detection of heavy metals in water samples. Contaminated water leads to serious health problems and environmental issues. Paper is ideally suited for point-of-care testing, as it is low cost, disposable, and multi-functional. Initial sensor designs were manufactured on paper substrates using combinations of inkjet printing and screen printing technologies using silver and carbon inks. Bismuth onion-like carbon nanoparticle ink was manufactured and used as the active material of the sensor for both commercial and paper-based sensors, which were compared using standard electrochemical analysis techniques. The results highlight the potential of paper-based sensors to be used effectively for rapid water quality monitoring at the point-of-need.