## Paper-Based Sensors for Contaminant Detection Using Surface Enhanced Raman Spectroscopy

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

## **Master of Science**

In

## **Environmental Engineering**

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April 23, 2015

Blacksburg, Virginia

## **Keywords:**

surface enhanced Raman spectroscopy, gold nanoparticles, paper-based sensors, SERS substrates, pathogen detection,  $\mu$  Pads, microfluidic device

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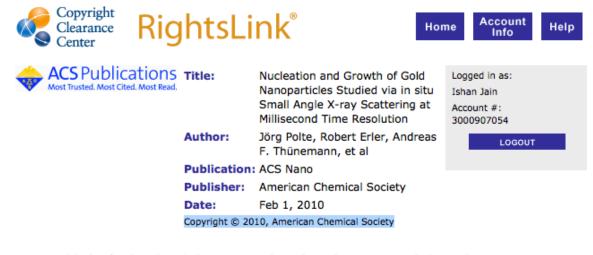


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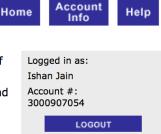
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