

Poster Session, 24-June, 18:00 - 19:00PM

Interaction of Silver Nanoparticles and Hydrogen Peroxide: Mechanisms and Application

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Abstract

Hydrogen peroxide (H_2O_2) can induce the degradation of silver nanoparticles (AgNPs). In this work, we found that the mechanisms of degradation are different depending on the concentration of AgNPs. When introducing the H_2O_2 into 0.06 mM of AgNPs, the AgNPs color was changed from yellow to transparent (Figure 1(a)). While adding the H_2O_2 into the higher concentration of AgNPs (0.24 mM), the blue color was attained (Figure 1(b)). The mechanisms of degradation were examined by transmission electron microscopy (TEM), X-ray Diffraction (XRD) and UV-vis spectrophotometer. Furthermore, we developed a flow-through system with colorimetric detection for determination of H_2O_2 . In the system, the H_2O_2 was injected into 0.06 mM of AgNPs carrier (Figure 2). The change of color was monitored by a colorimeter. Under the optimal condition, a linear calibration was obtained in range of 5-15 mg/L of H_2O_2 . The system offers high throughputs of analysis (20 samples/h). This method is successfully applied to determination of H_2O_2 in bleaching products.

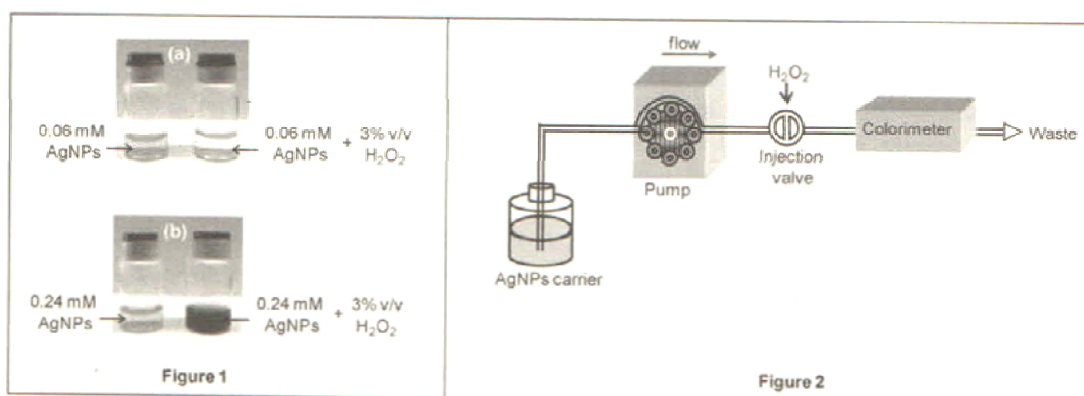


Figure 1 The degradation of AgNPs by H_2O_2

Figure 2 A flow-through system.

References

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