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**Colorimetric detection of benzoyl peroxide based on the etching of silver
nanoshells of Au@Ag nanorods**

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Highlights

- A fast, sensitive, and high-resolution colorimetric sensor for BPO was proposed.
- The limit of detection for benzoyl peroxide was down to 0.75 $\mu\text{mol L}^{-1}$.
- A portable test kit was designed for on-site assay of BPO in flour samples.
- The test kit is simple, cost-effective, user-friendly.

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