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A New Colorimetric, Near-infrared Fluorescent Probe for Rapid Detection of Palladium with High Sensitivity and Selectivity

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ABSTRACT

A new type of colorimetric, fluorescent palladium (Pd) probe characterized with beaconing fluorescence signal in the quiet near-infrared (NIR) region (centered ~717 nm), recognition response time of approximately 3 min, limit of detection (LOD) down to 5.1 ppb, and excellent recognition specificity over a wide range of interfering metal cations was developed. It is believed that the probe underwent sequential Pd^0-mediated oxidative addition and reduction elimination reactions, yielding typical D-π-A molecular skeleton of the final reaction product capable of intramolecular charge transfer (ICT). The benzothiazole moiety of the probe molecular skeleton is believed to play a vital trole in shifting the beaconing fluorescence signal to the quiet NIR region and accelerating the Pd^0 recognition process of the probe via the