Supplementary Information

PVP-stabilized cerium oxide-platinum nanocomposite synthesized in TEG: pro-/antioxidant activities

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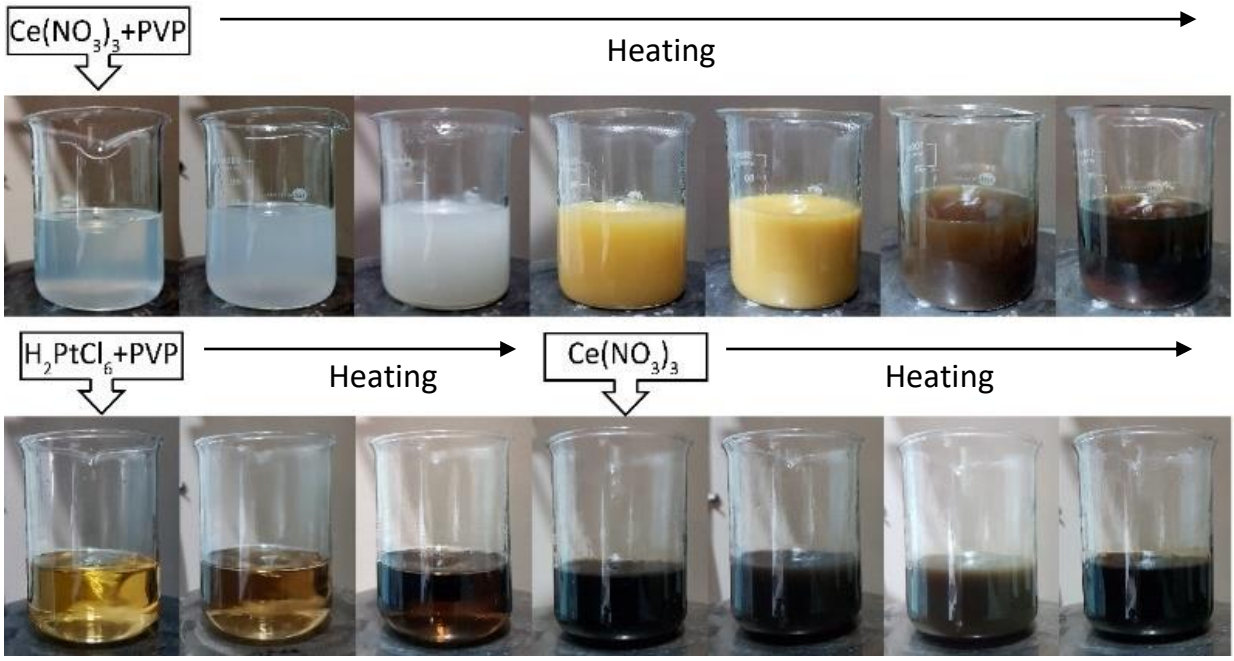
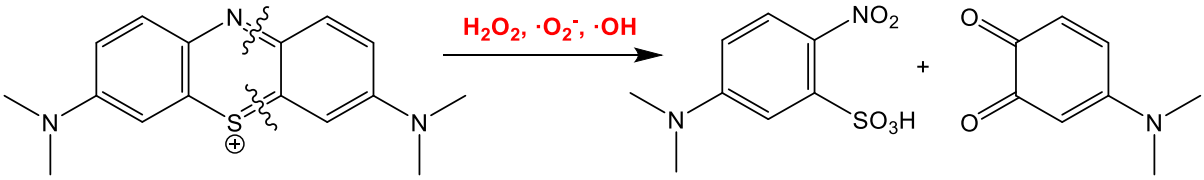
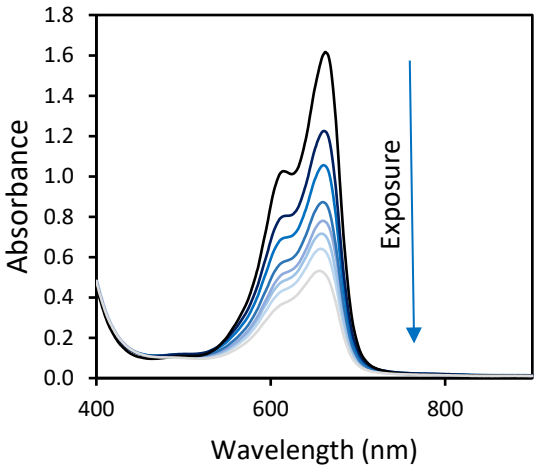


Fig. S1. Appearance of the systems during the synthesis: top – pristine CeO_2 nanoparticles (PVP-CeNPs), bottom – CeO_2 containing 2 wt.% of Pt nanoparticles (PVP-CeNPs-Pt). The preparation of pristine platinum nanoparticles (PVP-PtNPs) is the same as in the bottom figure before the addition of cerium salts.





Fenton mechanism and ROS formation:

$EDTA\text{-}Fe^{3+} + H_2O_2 \rightarrow EDTA\text{-}Fe^{2+} + HOO\bullet + H^+$

$EDTA\text{-}Fe^{2+} + H_2O_2 \rightarrow EDTA\text{-}Fe^{3+} + \bullet OH + OH^-$

$HOO\bullet + OH^- \leftrightarrow O_2^{\bullet -} + H_2O$

$EDTA\text{-}Fe^{2+} + O_2 \rightarrow EDTA\text{-}Fe^{3+} + O_2^{\bullet -}$

$EDTA\text{-}Fe^{3+} + O_2^{\bullet -} \rightarrow EDTA\text{-}Fe^{2+} + O_2$

Fig. S2. (Top) Decomposition of MB and (bottom left) decrease of MB adsorption spectra under the Fenton reaction conditions at pH 7.0 in time (decrease of absorbance at λ_{max} = 662 nm). (Bottom right) The equation describing the Fenton mechanism and ROS formation.

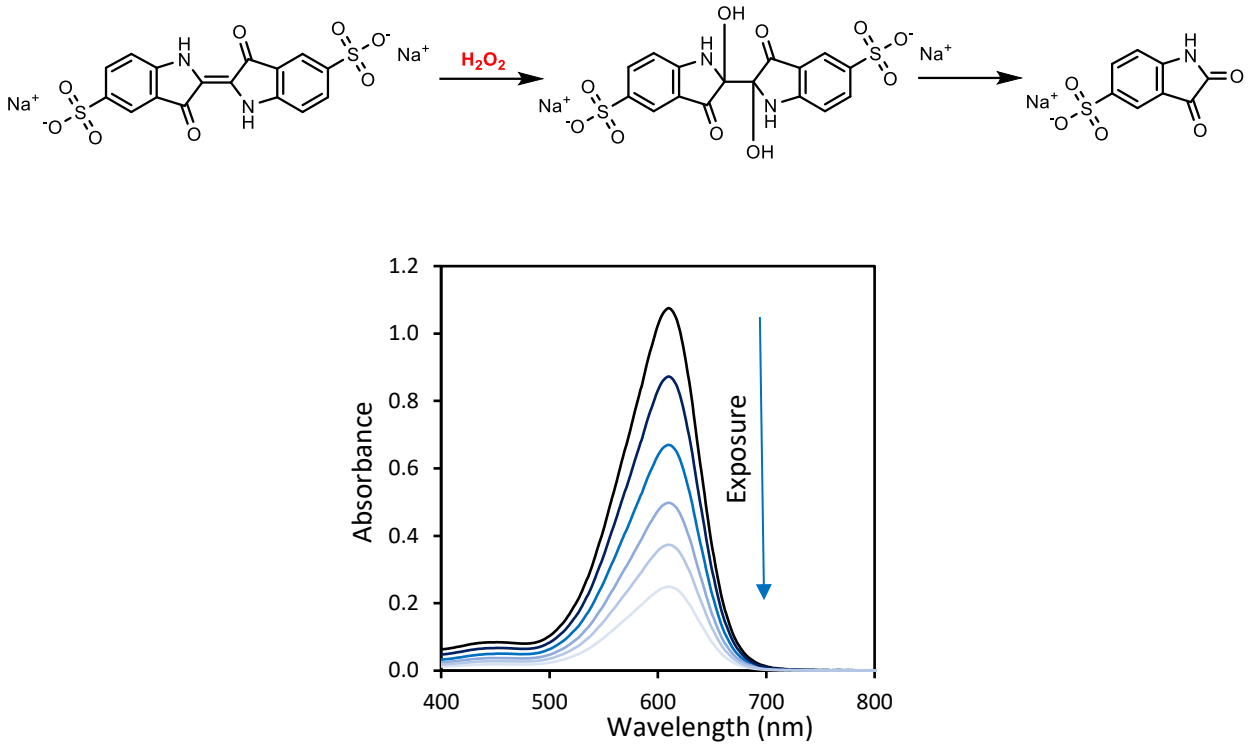


Fig. S3. (Top) Decomposition of IC and (bottom) decrease of IC adsorption spectra under the H_2O_2 bleaching conditions at pH 7.0 in time (decrease of absorbance at λ_{max} = 610 nm).

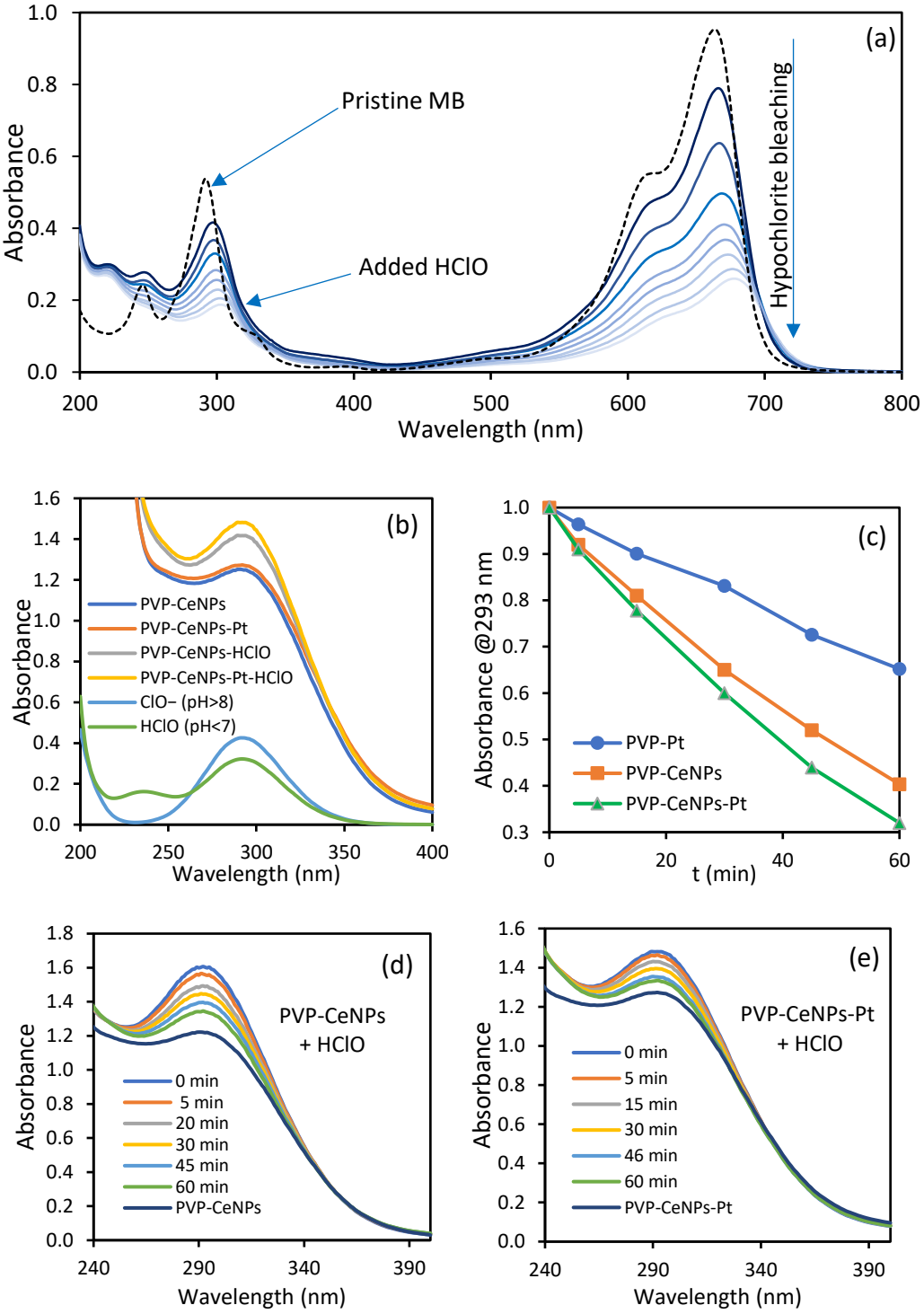


Fig. S4. (a) Decrease of MB adsorption spectra in the presence of HClO at pH 7.0 as a function of time. (b) Absorption spectra of PVP-CeNPs and PVP-CeNPs-Pt compared to spectra of PVP-CeNPs-HClO and PVP-CeNPs-Pt-HClO, and HClO and ClO^- species at pH 7.0. (c) Dynamics of hypochlorite decomposition in the presence of PVP-CeNPs (~0.3 mM), PVP-CeNPs-Pt (~0.3 mM) and PVP-PtNPs (6 μM Pt) at pH 7.0 as a function of time. (d, e) The behavior of PVP-CeNPs-HClO and PVP-CeNPs-Pt-HClO adsorption spectra at pH 7.0 as a function of time.

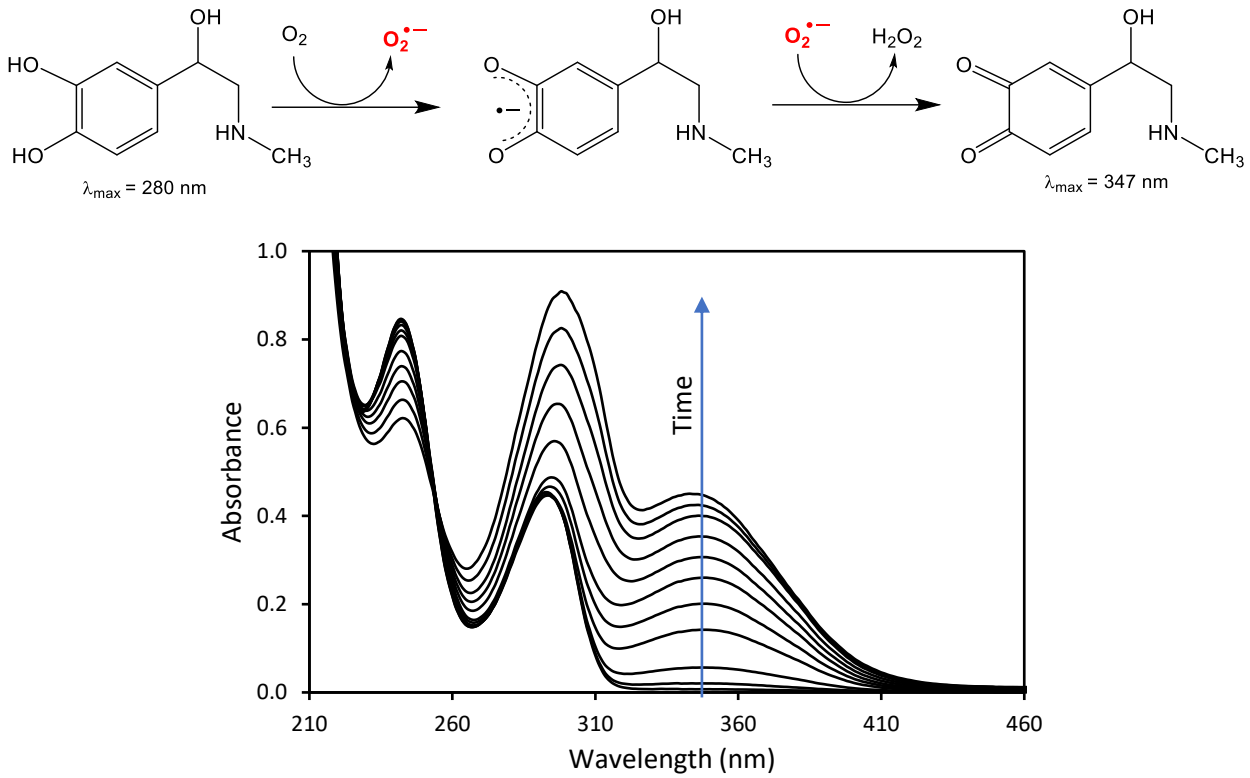


Fig. S5. (Top) Schematic of adrenaline autoxidation and (bottom) change of the absorption spectra as function of time (increase in absorbance at λ_{max} = 347 nm).

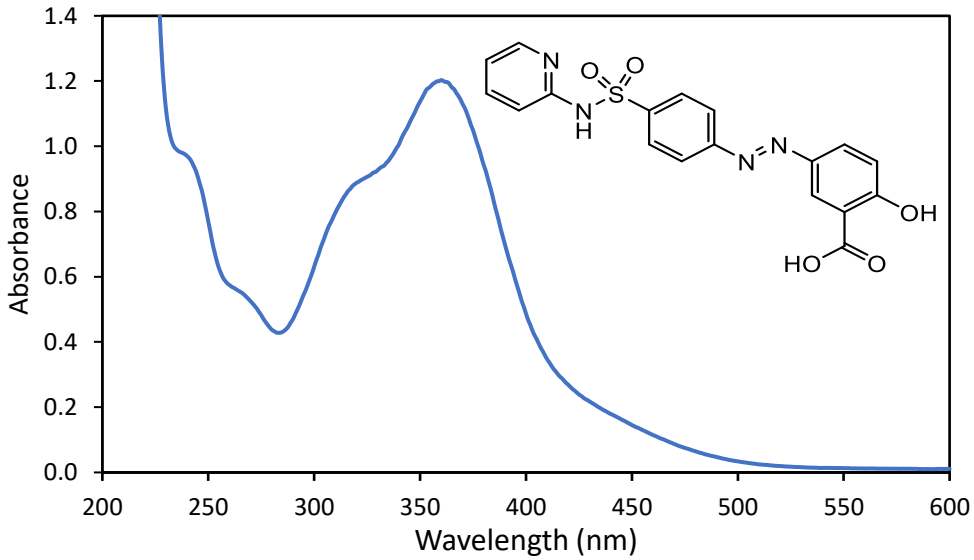


Fig. S6. UV-vis absorption spectrum of 0.1 mM sulfasalazine solution in water (λ_{max} = 360 nm). The schematic structure of the sulfasalazine molecule is shown in the inset.