Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

Visualized sensing of erythritol using a simple enzyme-free catechol-based hydrogel film

Xinyue Zhang,[1] Si Wu,*[1,2] Tao Feng,*[1,2] Yuanhao Yan,[1] Shijing Wu,[1] Yinyu Chen,[1] Yu Wang,[1] Qingmiao Wang,[1] Ning Hu,[1] Li Wang[1]

[1]College of Resources and Environment Engineering, Wuhan University of Science and Technology, Wuhan 430081, China

[2]Hubei Key Laboratory for Efficient Utilization and Agglomeration of Metallurgic Mineral Resources, Wuhan University of Science and Technology, Wuhan, 430081, China

*Corresponding Authors

E-mail: siwu@wust.edu.cn (Si Wu)

E-mail: fengtaowhu@163.com (Tao Feng)

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CV curves of the catechol-Chit^0 hydrogel films

The CV curves of the catechol-Chit^0 hydrogel films before and after FPBA treatment and after sweetener treatment were demonstrated in Figure S1. The redox signals in S1a to S1f decreased after treated with FPBA. Moreover, Figure S1a shows that the redox signals were essentially unchanged after treatment with 0.1 mM erythritol. Figures S1b to S1f investigate that after sucrose, glucose, fructose, xylitol and mannitol treatment, the redox signals almost returned to the initial state.

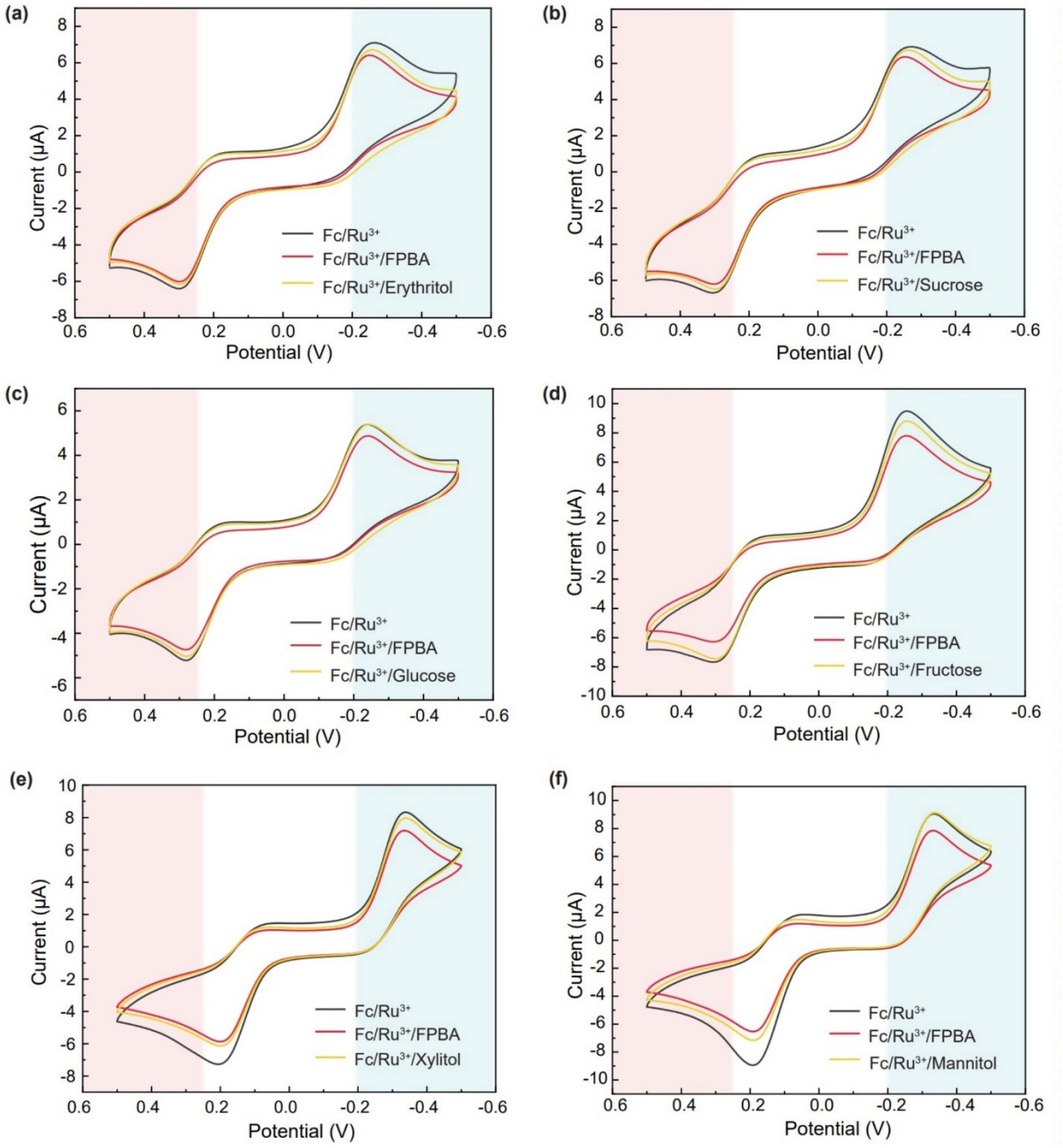

Figure S1. CV curves of the catechol-Chit^0 hydrogel films after treatment with 5 mM FPBA and then 0.1 mM (a) erythritol, (b) sucrose, (c) glucose, (d) fructose, (e) xylitol and (f) mannitol. The scan rate was 50 mV/s.

Microstructure characterization of the catechol-Chit^0/agarose hydrogel film

After the fabrication of the catechol-Chit^0/agarose hydrogel film on ITO electrode, the catechol-Chit^0/agarose hydrogel film was then stripped off, freeze-dried, sprayed with gold, and then imaged by scanning electron microscopy (SEM). Figure S2a suggests that the surface of the catechol-Chit^0/agarose hydrogel film was smooth and dense. Figure S2b demonstrates that the thickness of the film was about 7 µm.

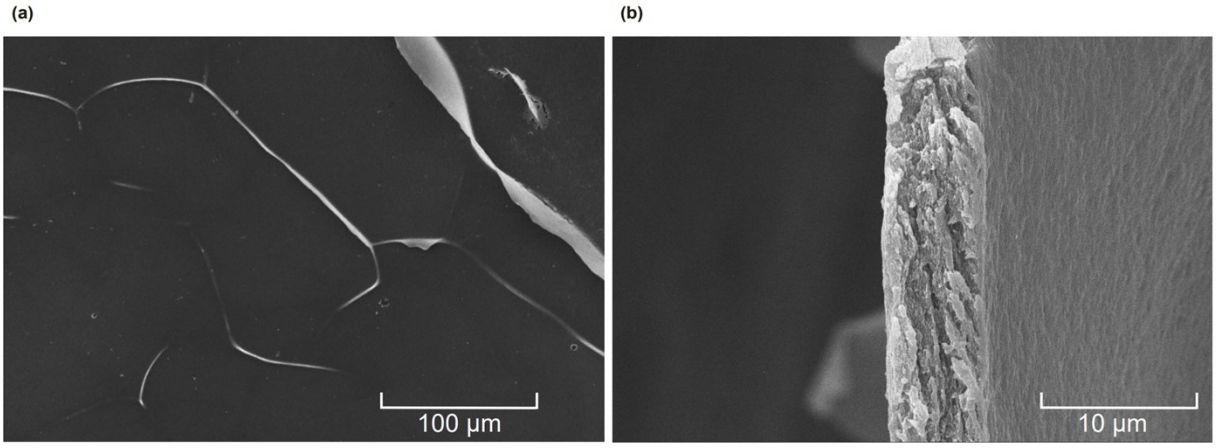

Figure S2. Microstructure characterization of the catechol-Chit^0/agarose hydrogel film of (a) the surface section, (b) the cross section.

HSV changes of the reduced catechol-Chit^0/agarose hydrogel film calculated by Matlab and a cell phone

The bar charts in Figure S3 summarize the changes in Hue (H), Saturation (S) and Value (V) values of the reduced catechol-Chit^0/agarose hydrogel film calculated by Matlab and a cell phone after different sweetener treatments. It can be seen that erythritol can't be identified from the other sweeteners when the catechol-Chit^0/agarose hydrogel film was in reduced state, which was consistent with the previous results of optical absorbance changes.

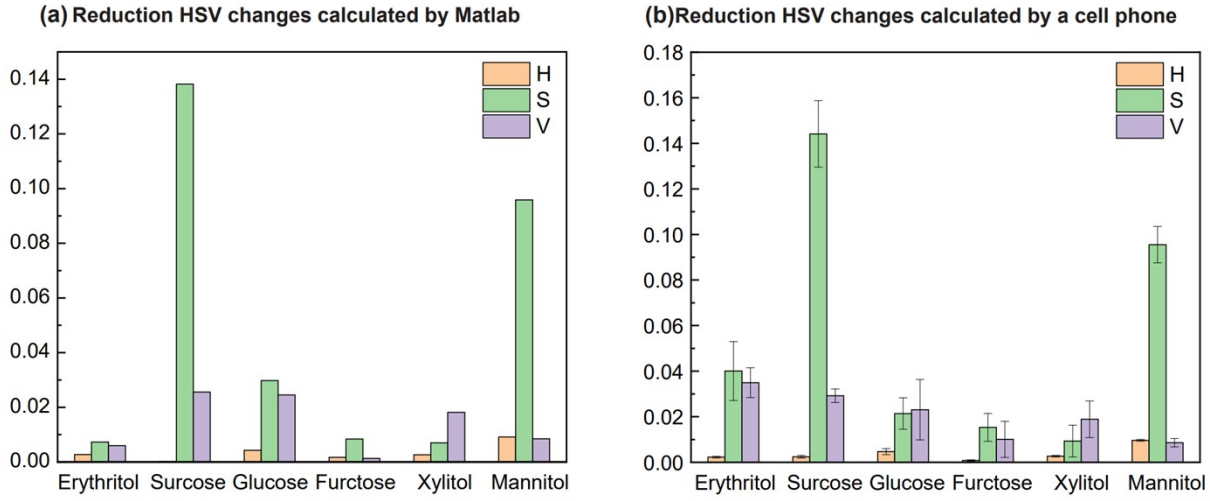

Figure S3. HSV changes of the reduced catechol-Chit^0/agarose hydrogel film calculated by Matlab and a cell phone.

Hue and Value changes of the oxidized catechol-Chit^0 hydrogel film calculated by Matlab and a cell phone

The bar chart in Figure S4 shows that the ΔHue and ΔValue signals of the oxidized catechol-Chit^0 hydrogel film after treatment of sugar-containing and erythritol-containing samples. These results suggest that the ΔHue and ΔValue signals of the films immersed in sugar-containing products were significantly different from those treated with erythritol-containing soda and syrup products.

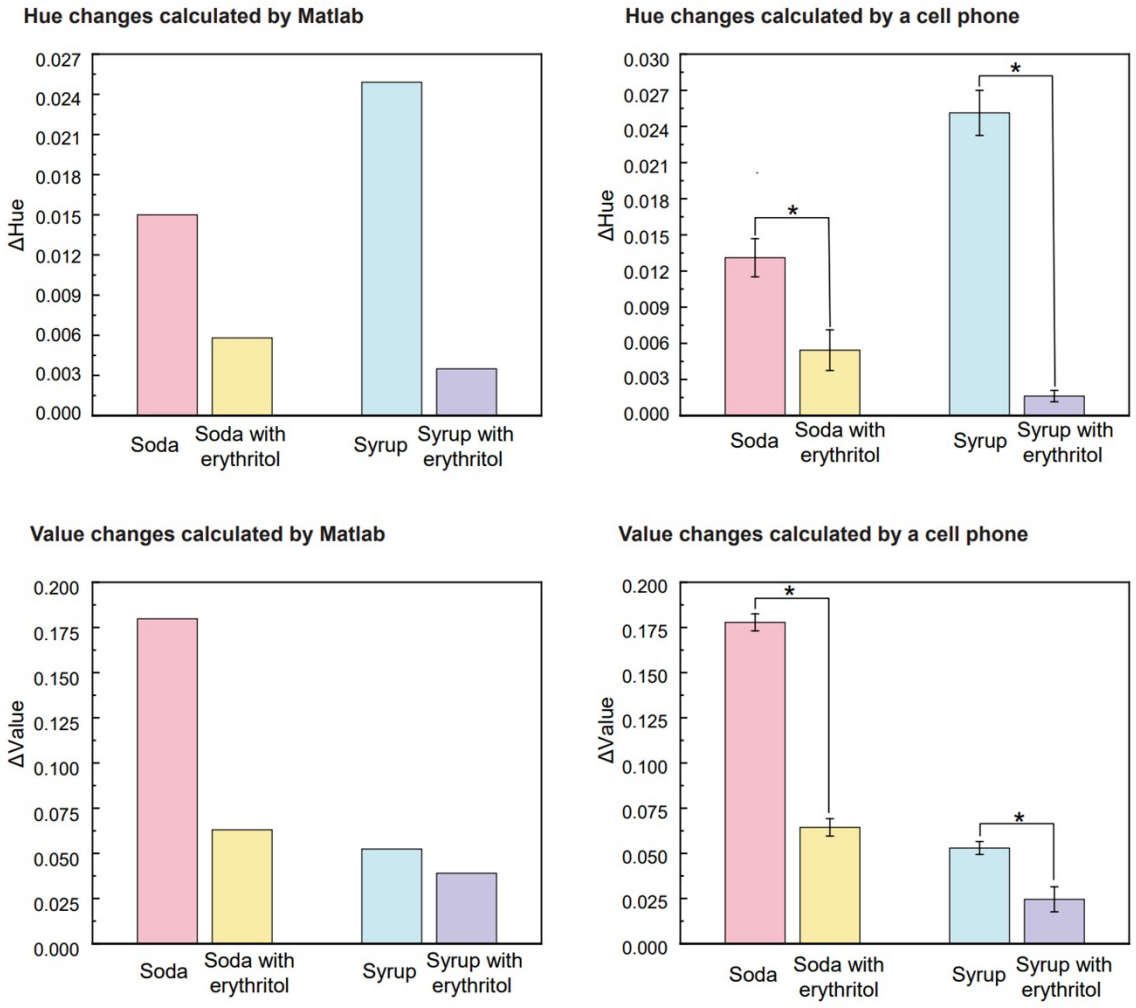

Figure S4. Non-enzymatic detection of erythritol in real food products. Comparison of sugar-containing and erythritol-containing samples by observing ΔHue and ΔValue of the FPBA treated oxidized catechol-Chit^0 hydrogel films using Matlab and a simple cell phone imaging measurement (* near the bar indicates a significant difference, $p < 0.05$).