Electronic Supplementary Information

Reusable alcohol oxidase-nPtCu/alginate beads for highly sensitive ethanol assay in beverages

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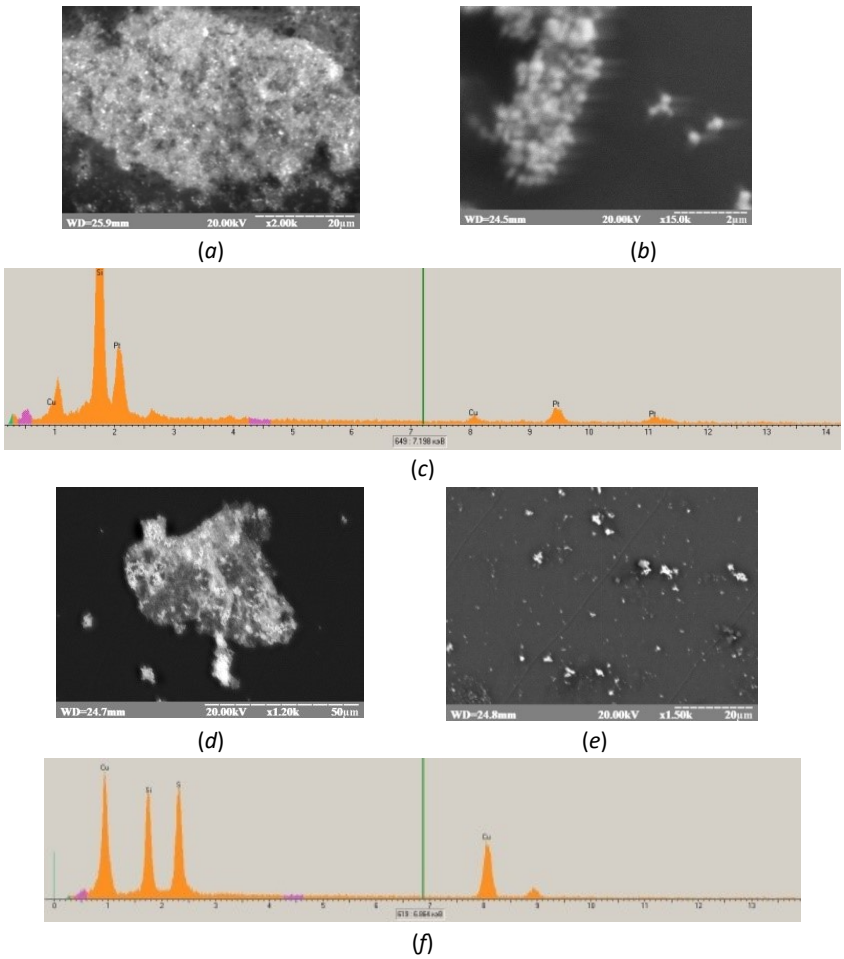

Fig. ESI 1. Characteristics of the nPtCu (*a* – *c*) and nCu (*d* – *f*): SEM images for ×2.000 magnification (*a*) (scale bar 20 µm), for ×15.000 magnification (scale bar 2 µm) (*b*), for ×1.200 magnification (scale bar 50 µm) (*d*) and for ×6.000 magnification (scale bar 10 µm) (*e*); X-ray spectral microanalysis (*c* and *f*). The accelerating voltage was 20 kV for all images.

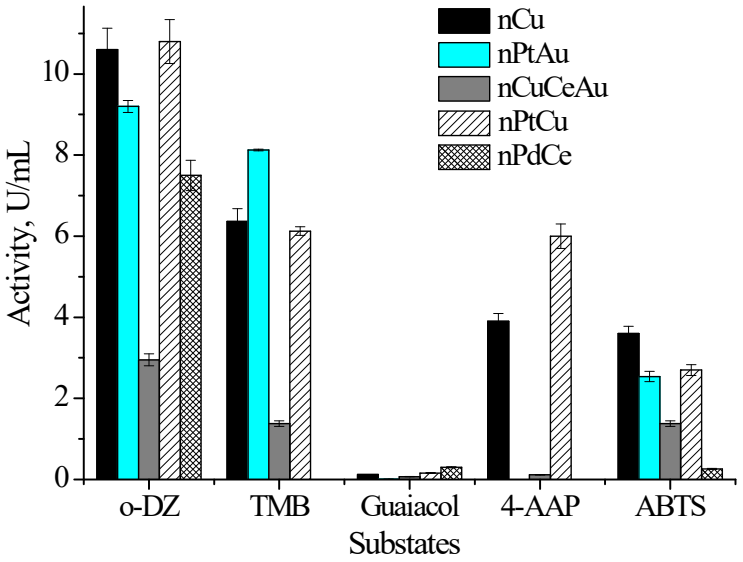

Fig. ESI 2. Substrate specificity of synthesized NZs in peroxidative reaction. ABTS, 4-AAP, guaiakol, TMB and *o*-DZ . ABTS – (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid); 4-AAP – 4-aminoantipyrine; TMB – 3,3',5,5' -tetramethyl benzidine and *o*-DZ – *o*-dianisidine.

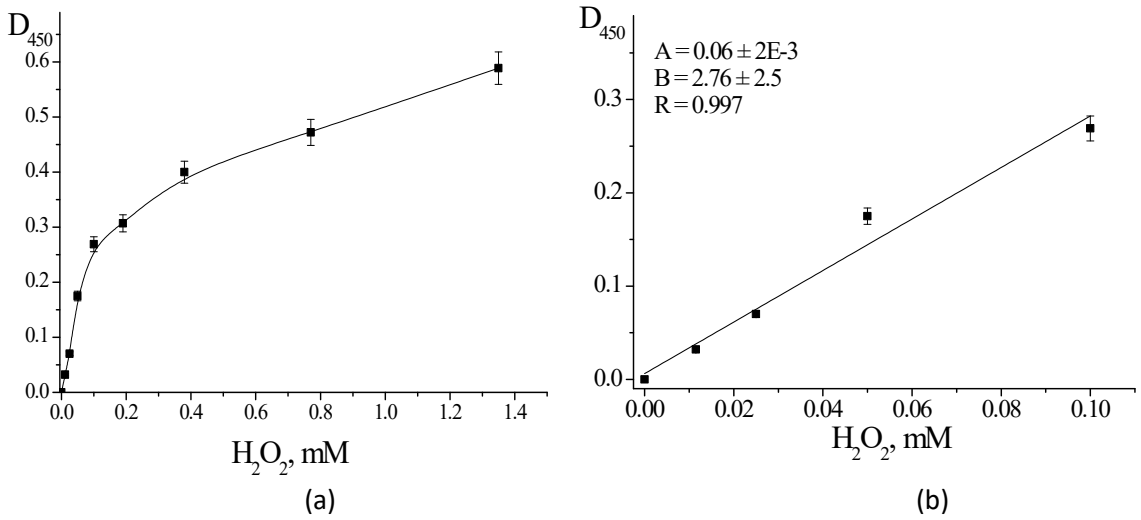

Fig. ESI 3. The dependence of OD of reaction mixture on the concentrations of H_2O_2 in final mixture (*a*) and linear calibration curve (*b*) for alginate beads loaded with nPtCu. *A*, *B* - parameters for the linear regression line; *R* - correlation coefficient.

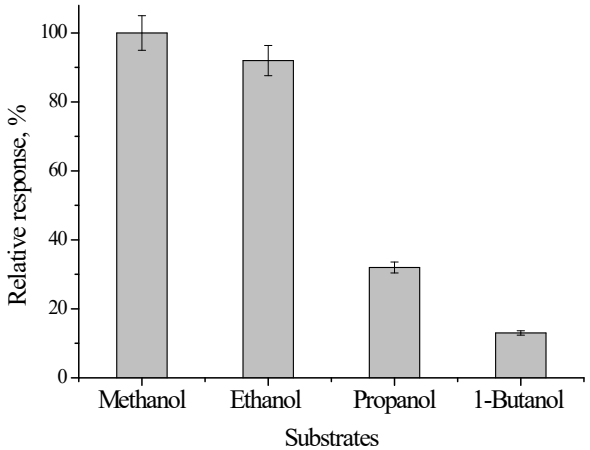

Fig. ESI 4. Relative response of nPtCu-AO/alginate beads toward various 1 mM alcohols. The analytical signal was exposed in relative units (%) referred to the maximum value for methanol (100%).

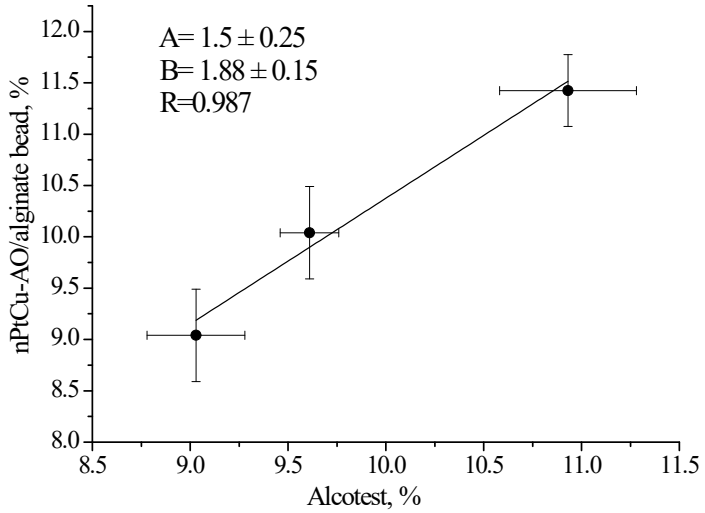

Fig. ESI 5. Correlations between the results of ethanol determination by two methods: "nPtCu-AO/alginate bead" and reference method by the use of "Alcotest". Tested samples: liquor "Aperitif" (***a***), champagne "Latini Sparkling" (***b***), and wine "Aznauri" (***c***).

Table ESI 1. Methods of synthesis of NZs

No	NZs	Mixture 1	Mixture 2	Mixture 3
1	PtCu	5 mL 10 mM H_2PtCl_6 + 10 mL 15 mM CTAB + 0.2 ml 100 mM AA	Mixture 1 + 5 mL 50 mM $CuSO_4$ + 0.2 mL 100 mM AA	-
2	PdCe	5 mL 50 mM $CeCl_3$ + 10 mL 15 mM CTAB +0.1 mL 10 mM AA	Mixture 1 + 5 mL 10 mM $PdCl_3$ + 0.5 mL 10 mM AA	-
3	PtCu	2 mL 10 mM H_2PtCl_6 + 10 mL 15 mM CTAB, + 0.2 mL 10 mM AA	Mixture 1 + 5 mL 10 mM $CuSO_4$ + 0.2 mL 10 mM AA	-
4	PtAu	2 mL 10 mM H_2PtCl_6+ 10 mL 15 mM CTAB +0.1 mL 10 mM AA	Mixture 1 + 2 mL 17 mM $HAuCl_4$ + 0.2 mL 10 mM AA	-
5	FePtAu	0.5 mL 100 mM $FeCl_2$+ 10 mL 15 mM CTAB + 0.1 mL 10 mM AA	Mixture 1 + 0.5 mL 10 mM H_2PtCl_6 + 0.2 mL 10 mM AA + 0.2 mL 10 mM KJ	0.1 mL 17 mM $HAuCl_4$