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BIENAL DA SOCIEDADE
BRASILEIRA DE
ELETROQUÍMICA E
ELETROANALÍTICA**

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ORGANIZAÇÃO:



Selective Bioelectrooxidation of Seawater using Abiological Copper-containing Proteins

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Seawater is widely considered an abundant resource for water splitting reaction to produce molecular hydrogen (H₂) and oxygen (O₂). However, its practical application is hampered due to chlorine-related competing reactions at the anode. We overcome the practical limitation of bioelectrooxidation of seawater using apo-reconstituted proteins with abiological copper(II) metal centers dispersed in heteropolysaccharide polymer shell. Our strategy showed significant advances for bioelectrooxidation of water both at pH 9 and in seawater (pH 7.6), with Cu(II)Myo having onset potential for OER ~10 mV lower compared to solely Cu(II)P, concomitantly to the track of reaction products using online differential electrochemical mass spectrometry (DEMS). The data was also supported by the monitoring of the electronic structure of the redox states Cu⁺²/Cu⁺¹ by in situ XANES absorption spectroscopy and electrochemistry.

Acknowledgments:

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References:

- [1] Iost, R.M., Venkatkarthick, R.; Nascimento, S.Q.; Lima, F.H.B.; Crespilho, F.N. Chemical Communications, 60, 2509-2511, 2024.
- [2] Macedo, L.J.A.; Hassan, A.; Sedenho, G.C.; Crespilho, F.N. Nature Communications, 1-11, 2020.