ELECTRONIC SUPPLEMENTARY INFORMATION (ESI) for

Interfacing an heteropolytungstate complex and gelatin through a coacervation process: design of bionanocomposite films as novel electrocatalyst.

Basma Khadro, Imane Baroudi, Anne-Marie Goncalves, Bruno Berini, Bruce Pegot, Farid Nouar, Thi Ngoc Ha Le, François Ribot, Christel Gervais, Florent Carn, Emmanuel Cadot, Christine Mousty, Corine Simonnet-Jégat, Nathalie Steunou.

Table 1. Main peaks in the FT-IR spectra of $[BW_{12}O_{40}]^{5-}$-G hybrid and corresponding assignments.

Gelatin (cm^{-1})[f]	**Gelatin (this work) (cm^{-1})**	**$[BW_{12}O_{40}]^{5-}$ (cm^{-1})[g]**	**$[BW_{12}O_{40}]^{5-}$ (this work) (cm^{-1})**	**$[BW_{12}O_{40}]^{5-}$-G hybrid (this work) (cm^{-1})**	**Band assignments**
1630	1648 (vs)			1646 (vs)	ν(C=O), δ(N-H)
1541	1543 (s)			1536 (s)	δ(N-H), ν(C-N), ν(C-C)
1450	1452 (m)			1454 (m)	δ(CH_2)
1410	1404 (sh)			1405 (sh)	ν(COO)
1334	1336 (w)			1336 (w)	δ(CH_2) wagging
12 35	1236 (w)			1238 (w)	ν(C-N), δ(N-H)
1080	1078 (w)			1078 (vw)	Skeletal ν (C-O)
		960 (s)	957 (s)	956 (s)	$\nu_{as}(W-O_d)$
		910 (s)	916 (s)	904(s)	$\nu_{as}(B-O_a)$
		807 (vs)	804 (vs)	825(vs)	$\nu_{as}(W-O_c-W)$

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[f] H. Staroszczyk, J. Pielichowska, K. Sztuka, J. Stangret, I. Kołodziejska, *Food Chem.*, 2012, **130**, 335.
[g] C. Rocchiccioli-Deltcheff, M. Fournier, R. Franck, R. Thouvenot, *Inorg. Chem*. 1983, **22**, 207-216.

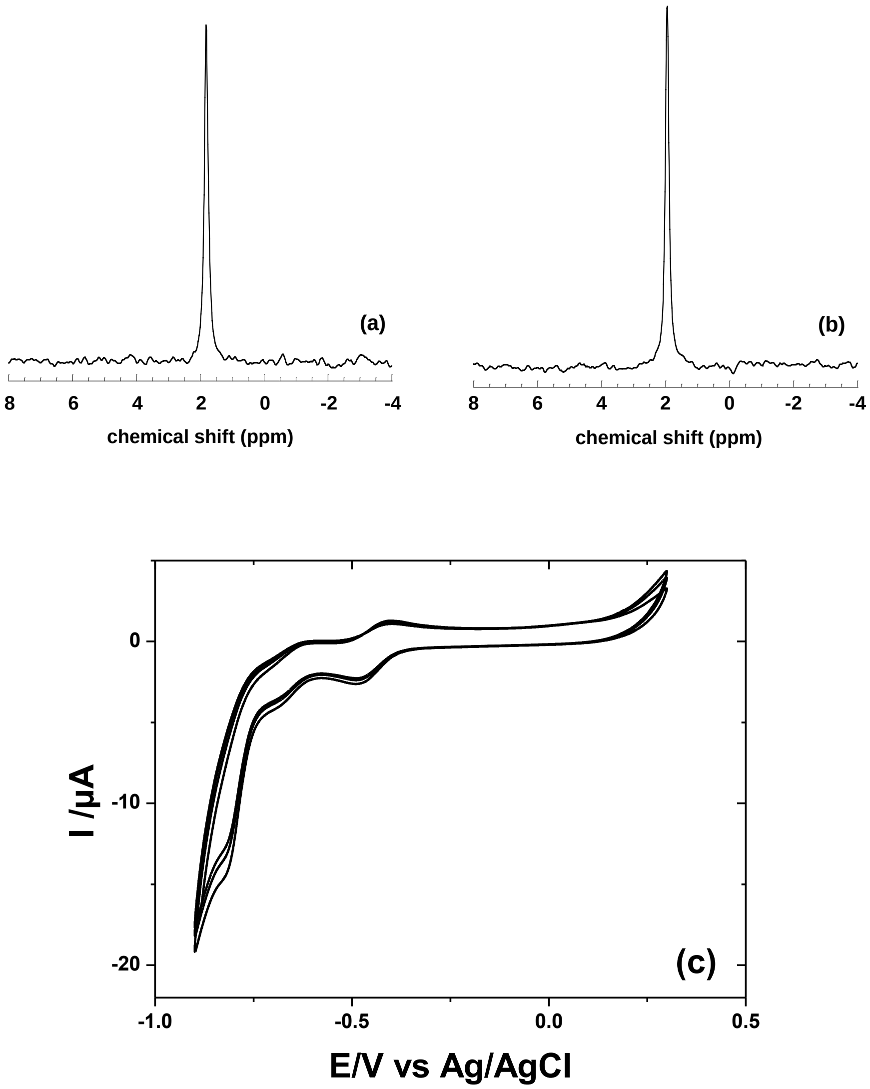

Figure S1. Characterization of $[BW_{12}O_{40}]^{5-}$ in aqueous solution ; (a)-(b)Solution ^{11}B NMR spectra of $[BW_{12}O_{40}]^{5-}$ (c = 5. 10^{-4} M) at (a) pH 3 and (b) pH 4.7; (c) cyclic voltammogram of $[BW_{12}O_{40}]^{5-}$ (c = 5.10^{-4} mol.L^{-1}) in $CHCl_2COOH/CHCl_2COONa$ 1M-1M at pH 3, Electrolyte 0.5 M Na_2SO_4 aqueous solution at pH 3. Scan rate: 100 mV s^{-1}.

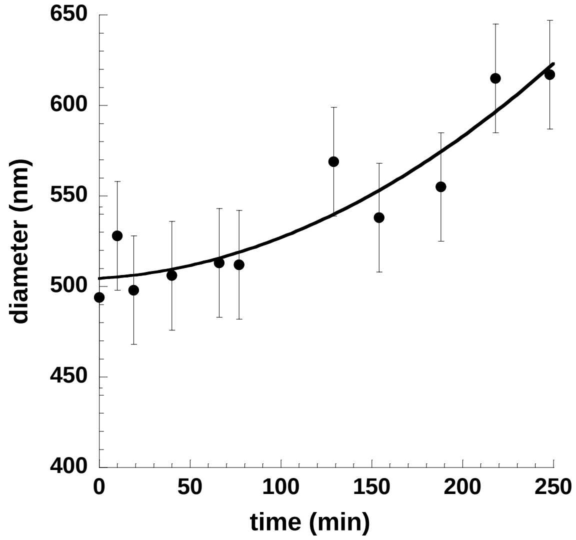

Figure S2. Evolution of colloids size (●) as measured by QELS upon ageing conditions without stirring (T = 40°C, pH 3) for [G] = 0.375 mM and [BW_{12}] = 0.23 mM. The continuous line corresponds to a second order polynomial fit and should be used as a guide for the eyes.

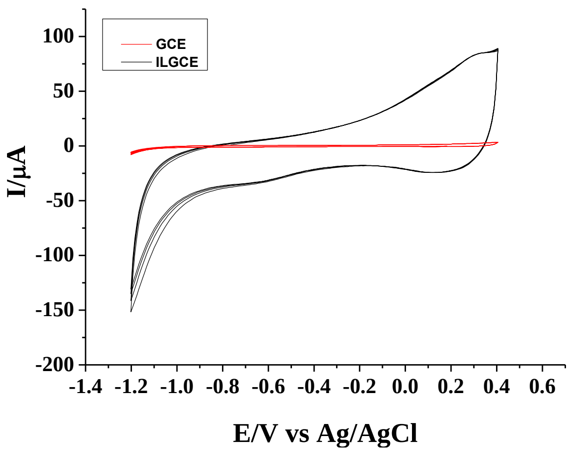

Figure S3. Cyclic voltammograms of GCE without ionic liquid and ILGCE (i. e. GCE modified with ionic liquid [bmim][PF_6]) in 0.5 M Na_2SO_4 aqueous solution at pH 3. Scan rate: 100 mV s^{-1}.

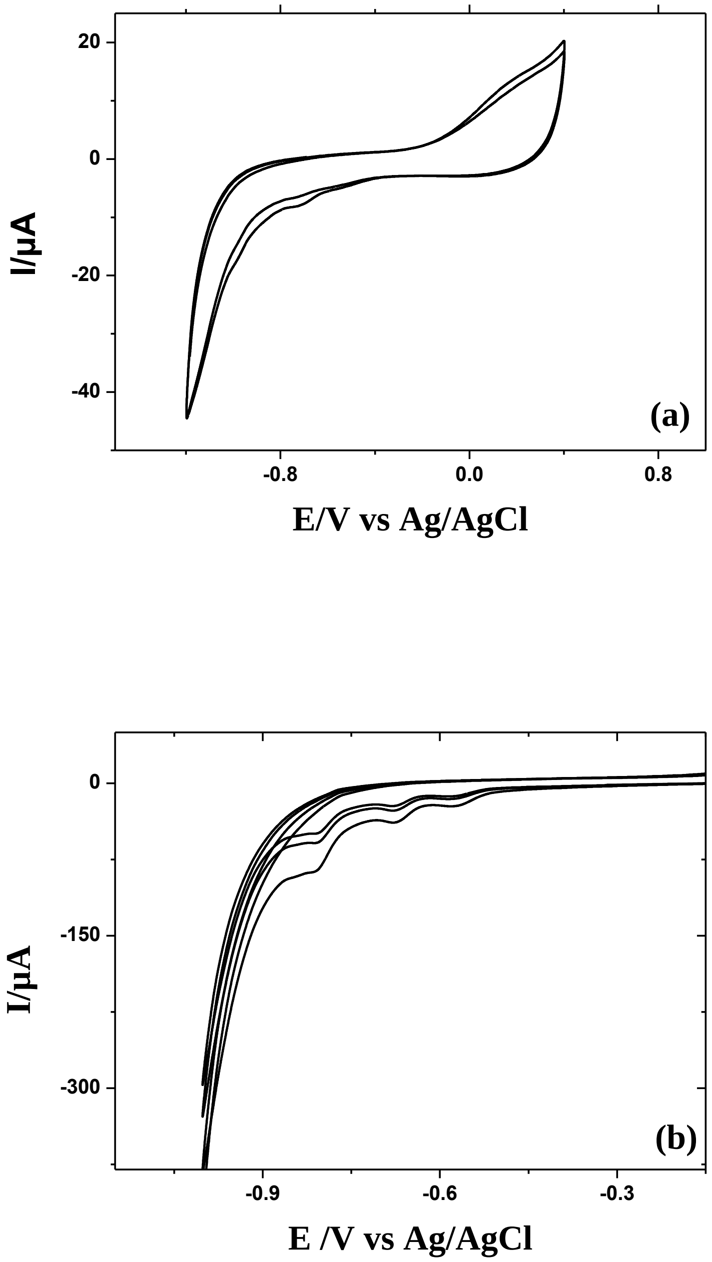

Figure S4. Cyclic voltammograms of (a) $[BW_{12}]$-ILGCE, (b) $[BW_{12}]$-G-ILGCE. Electrolyte 0.5 M Na_2SO_4 aqueous solution at pH 3. Scan rate: 10 mV s^{-1}.

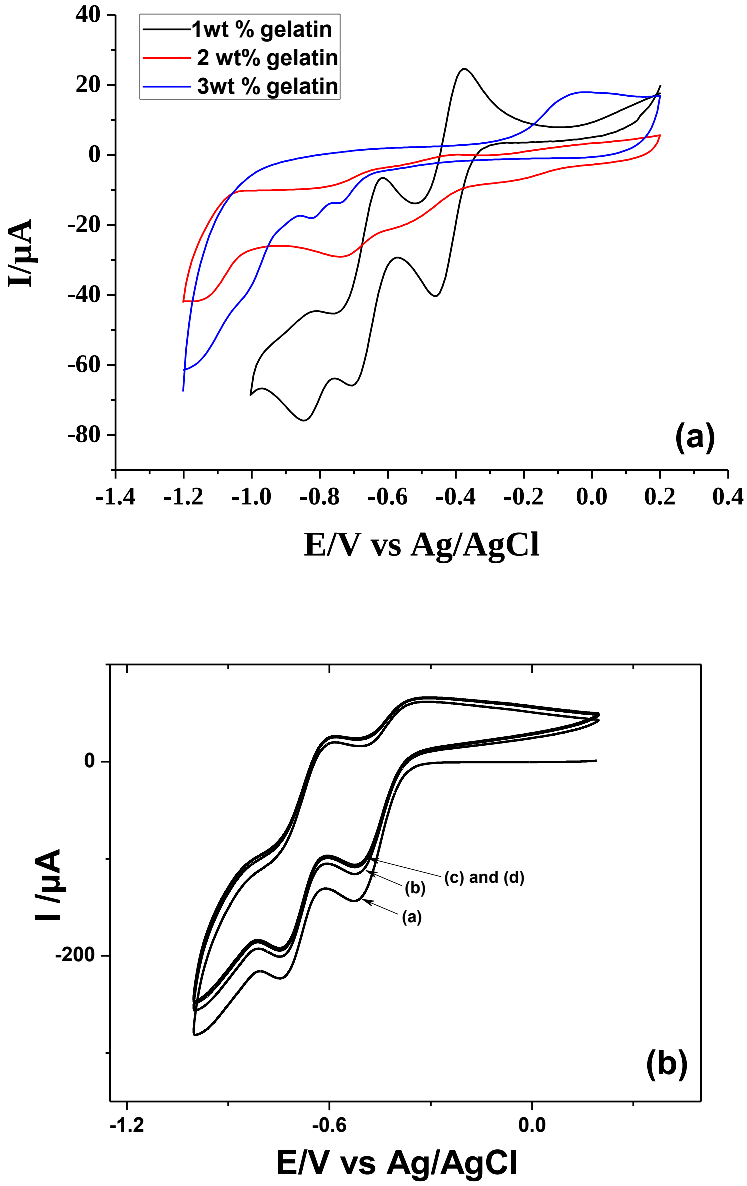

Figure S5. Cyclic voltammograms of (a) 2[BW_{12}]-G-ILGCE prepared with 1, 2 and 3 wt% of gelatin. Electrolyte 0.5 M Na_2SO_4 aqueous solution at pH 3. Scan rate: 10 mV s^{-1}. (b) 2[BW_{12}]-G-ILGCE in 0.5 M Na_2SO_4 aqueous solution at pH 3 at different cyclic numbers: (a) 1st, (b) 2nd, (c) 49th and (d) 50th cycles. Scan rate: 100 mV s^{-1}.

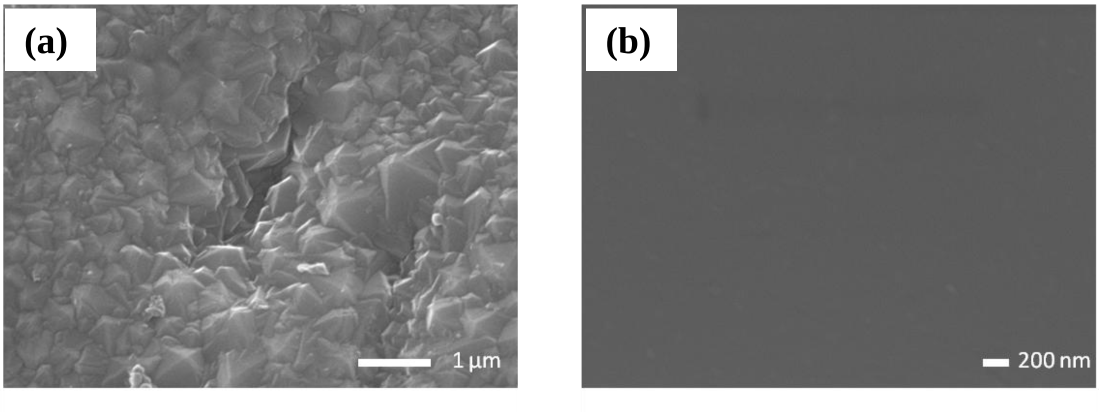

Figure S6. SEM images of (a) diamond wafer and (b) a gelatin film.

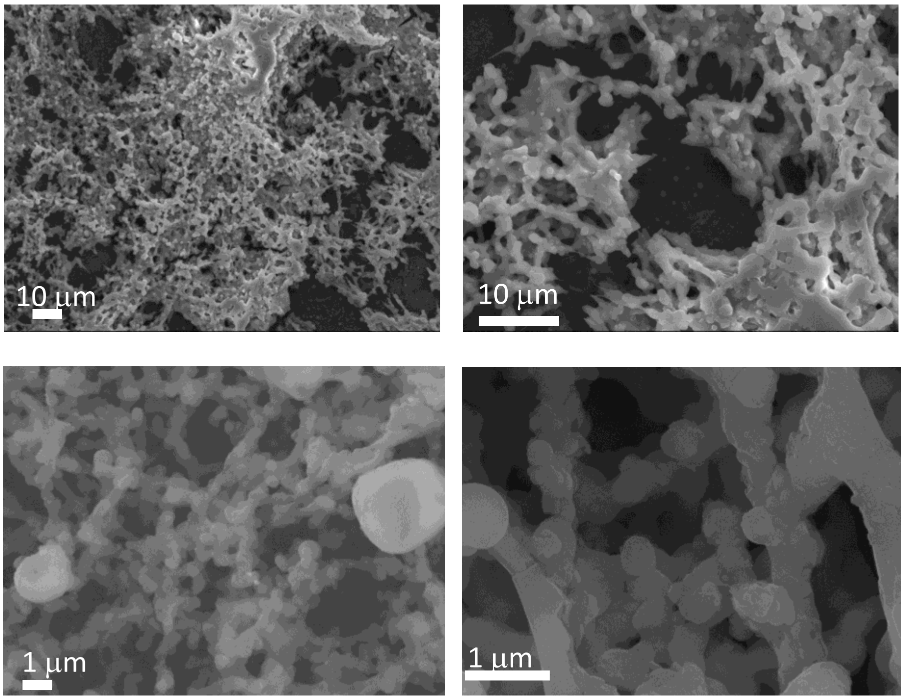

Figure S7. SEM images of 2[BW_{12}]-G-IL coatings prepared by deposition of 2 x 10 µL of a 0.5 mM [$BW_{12}O_{40}$]$^{5-}$ solution and 10 µL of 1 wt% solution of gelatin.

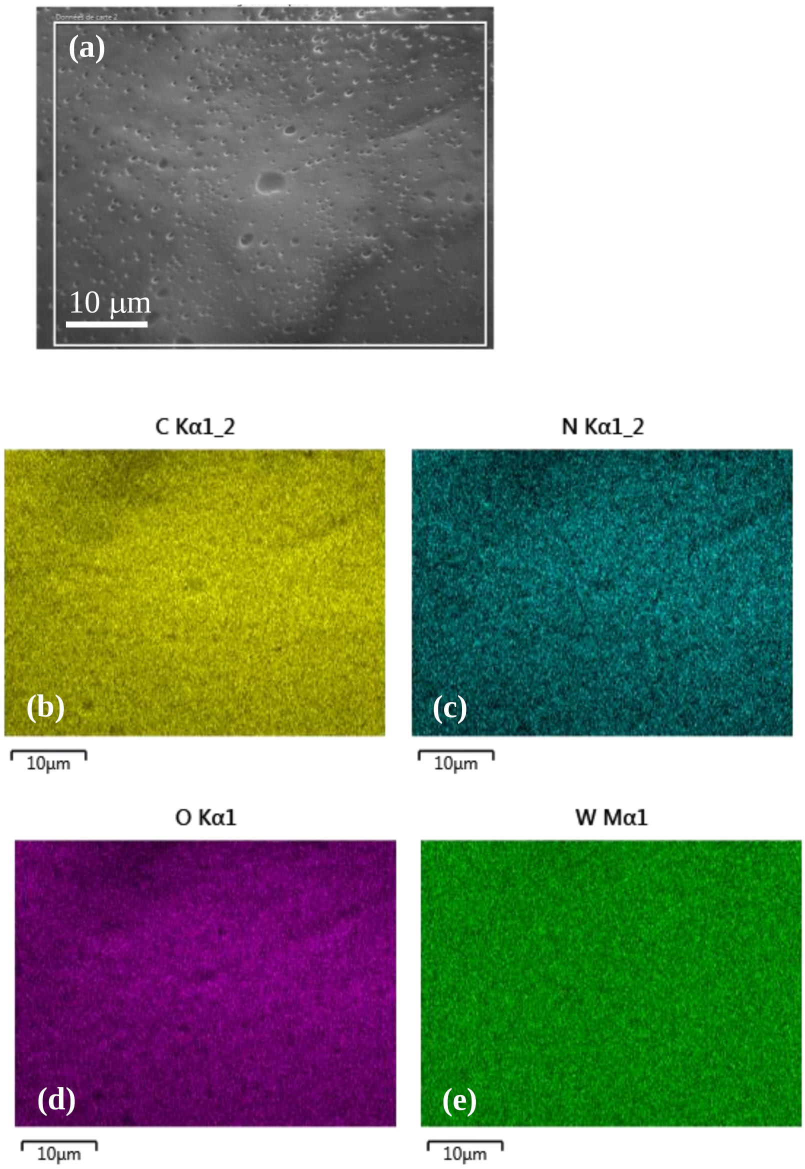

Figure S8. (a) SEM image of a 2[BW_{12}]-G-IL coatings prepared from the deposition of 2 x 20 μL of a 0.5 mM [$BW_{12}O_{40}$]$^{5-}$ solution and 20 μL of 1 wt% solution of gelatin. (b-e) corresponding elemental mapping of carbon (b), nitrogen (c), oxygen (d) and tungsten (e) by EDX spectroscopy.