Electronic Supplementary Material (ESI) for Environmental Science: Advances.

Electroleaching and electrodeposition of silver in ethaline 1:2 and propeline 1:3: transport properties and electrode phenomena

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Supplementary information

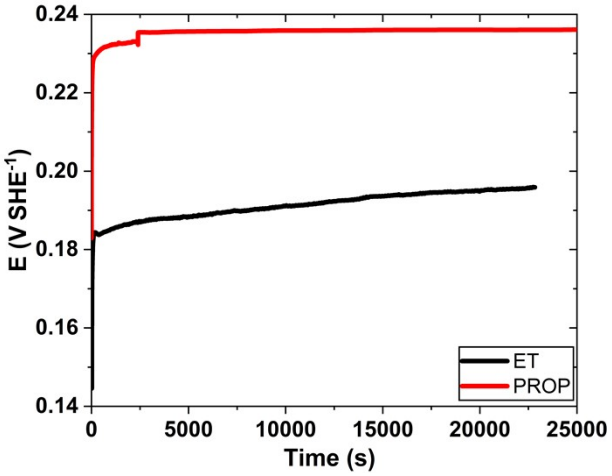

Figure SI- 1: Variation of the potential at the working electrode during the electroleaching runs at 1 mA cm^{-2} in ET1:2 at 40°C and PROP1:3 at 60°C

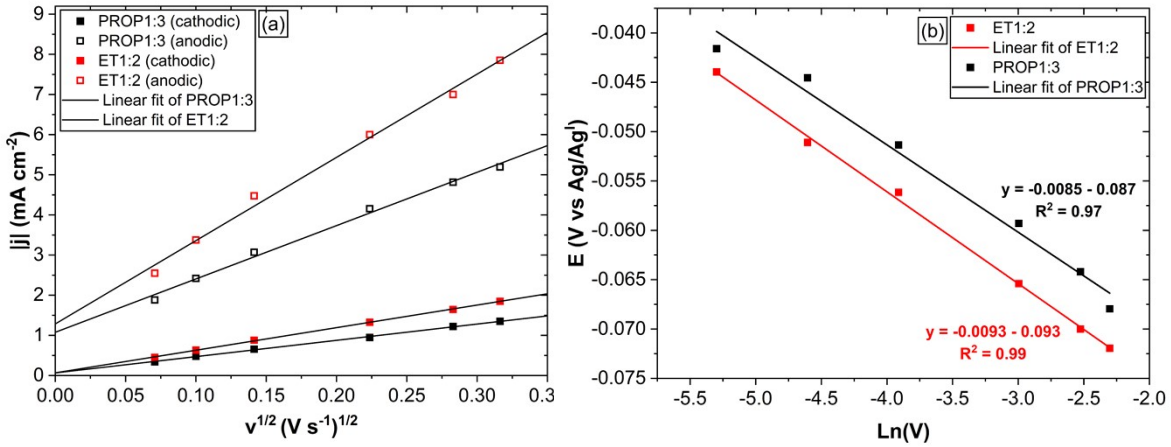

Figure SI- 3 : Effect of the scan rate on voltammograms (a) Variation of the current density peak for Ag deposition and dissolution with the square root of the scan rate b) Variation of the deposition peak potential with the natural logarithm of the scan rate for PROP13 and ET12.

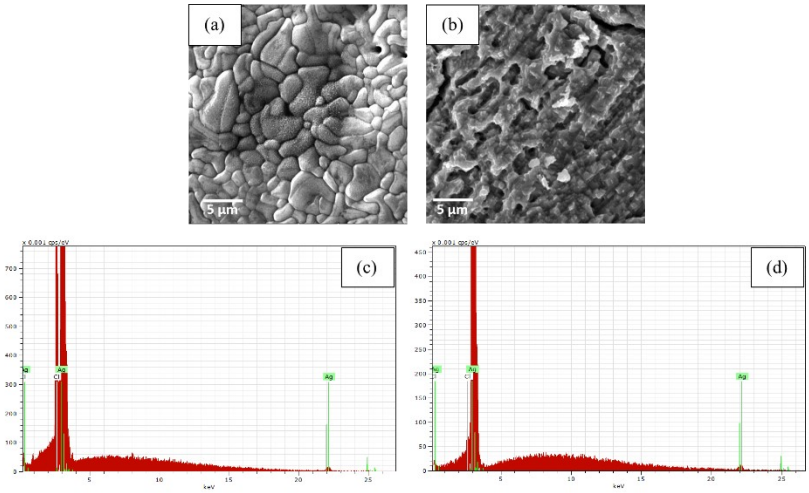

Figure SI- 2 : SEM views (a), (b) and EDX analysis of surface of the silver wire (c), (d) after anodic leaching at 1 mA cm^{-2} in PROP13 for 6 hours. At 40°C: (a), (c), and at 60°C: (b), (d)

Table SI- 1 : Results of diffusional and kinetic parameters for Ag electrodeposition from ET1:2 and PROP1:3 at 40°C, depending on the electrochemical technique employed.

DES	Method used	Scan rate ($mV\ s^{-1}$)	Rotation speed (rpm)	Water content (wt.%)	Dynamic viscosity (mPa.s)	Diffusion coefficient ($cm^2\ s^{-1}$)	$(D*\eta)/T_{(average)}$ (SI)	α	k_0 ($cm\ s^{-1}$)
PROP 1 :3	CV modelling	5	0	2.2	29.7	$4.1\ 10^{-7}$	$3.6\ 10^{-15} \pm 2\ 10^{-16}$	1	$2.5*10^{-5}$
		20				$3.6\ 10^{-7}$			$2.0*10^{-5}$
		5		3.2	27.5	$4.0\ 10^{-7}$			ND
		20		3.8	26.3	$4.5\ 10^{-7}$			
	Levich	2	400	2.9	28.2	$2.8\ 10^{-7}$	$2.6\ 10^{-15} \pm 2\ 10^{-16}$	ND	ND
		1				$3.0\ 10^{-7}$			
		2	600			$3.0\ 10^{-7}$			
		1				$3.1\ 10^{-7}$			
		0	200 -600	4.0	26.1	$2.8\ 10^{-7}$			
	Cottrell	0	0	3.7	26.5	$2.9\ 10^{-7}$	$2.40\ 10^{-15} \pm 6\ 10^{-17}$	ND	ND
						$2.8\ 10^{-7}$			
						$2.8\ 10^{-7}$			
ET 1 :2	CV modelling	5	0	3.3	21.3	$7.0\ 10^{-7}$	$4\ 10^{-15} \pm 1\ 10^{-15}$	1	$1.2*10^{-5}$
		20				$4.6\ 10^{-7}$			$1.5*10^{-5}$
	Levich	0	200-800	2.7	22.4	$4.2*10^{-7}$	$2.99\ 10^{-15}$	ND	ND
	Cottrell	0	0	2.66	22.37	$4.1*10^{-7}$	$2.87\ 10^{-15} \pm 8\ 10^{-17}$	ND	ND
						$4.0*10^{-7}$			
						$3.9*10^{-7}$			

ND: no determination

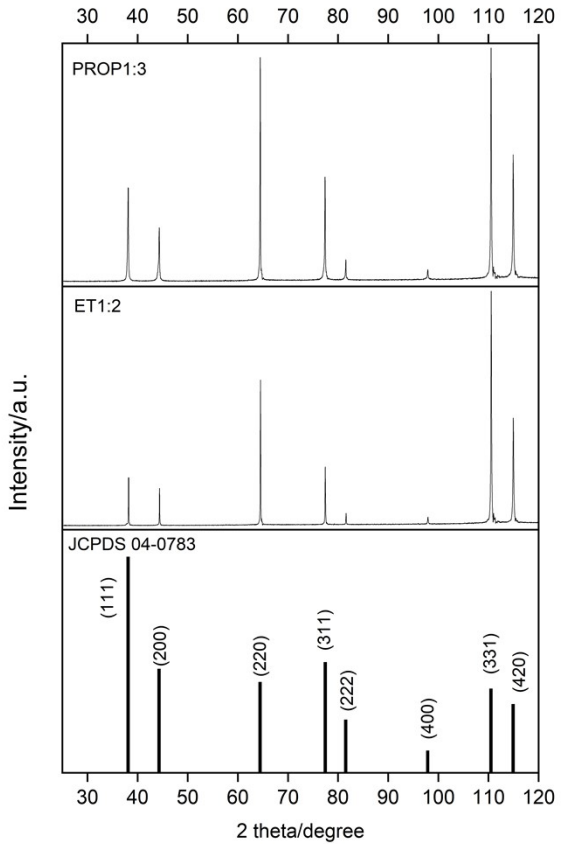

Figure SI- 4 : XRD spectra of the cathode with the standard spectrum of metallic silver (JCPDS 04-0783)