Supplementary Information

Electrodeposition of Nanocrystalline Fe_xCo_{1-x} Thin Films from Choline Chloride-Urea Deep Eutectic Solvents

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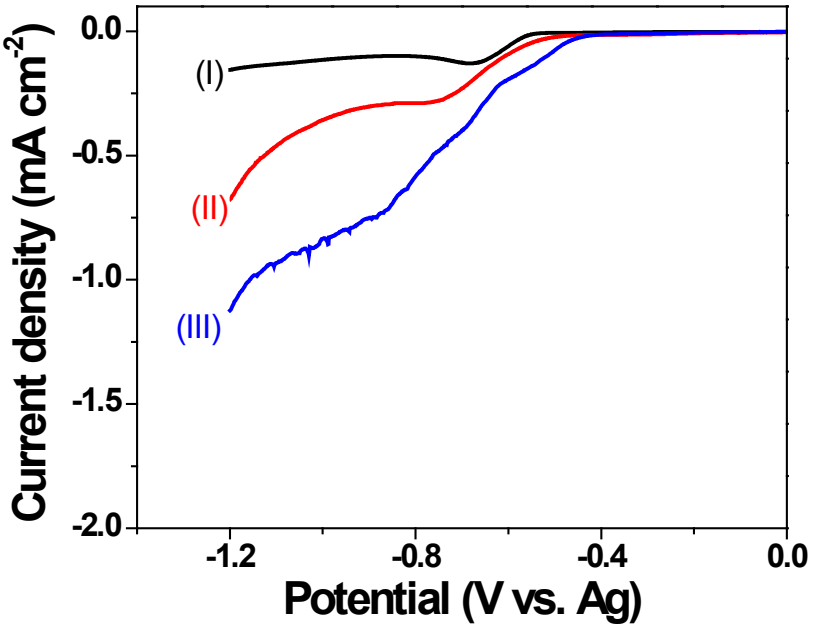

Figure S1. LSV curves with DES only at different temperatures (I): 70, (II): 100, (III): 130 ºC. The scan rate was fixed at 1 mV/s.

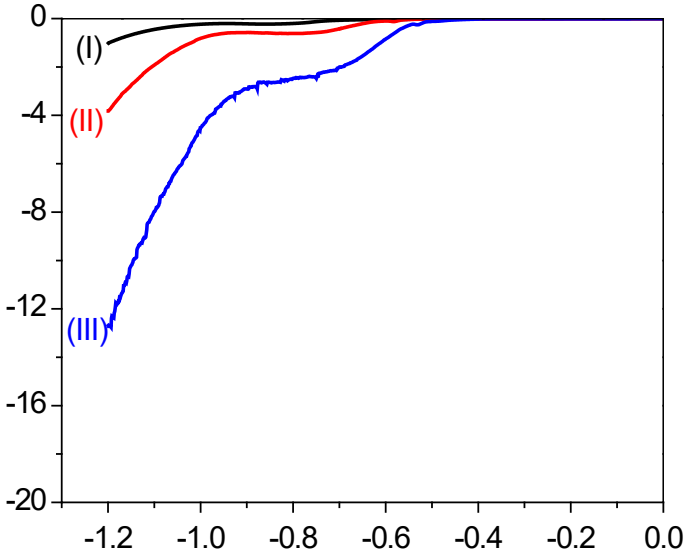

Figure S2. LSV curves for Co electrodepositions in DES at different temperatures (I): 70, (II): 100, (III): 130 ºC, with 15 mM $CoCl_2$. The scan rate was fixed at 1 mV/s.

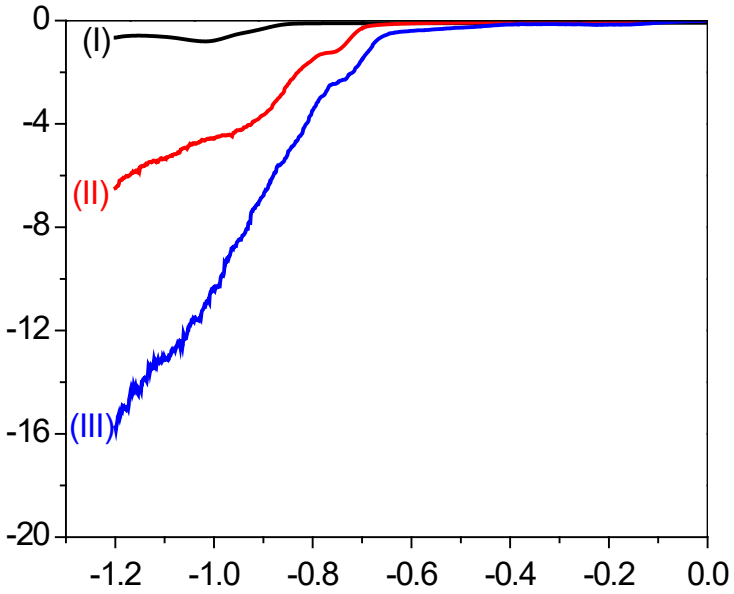

Figure S3. LSV curves for Fe electrodepositions in DES at different temperatures (I): 70, (II): 100, (III): 130 ºC, with 85 mM $FeCl_3$. The scan rate was fixed at 1 mV/s.

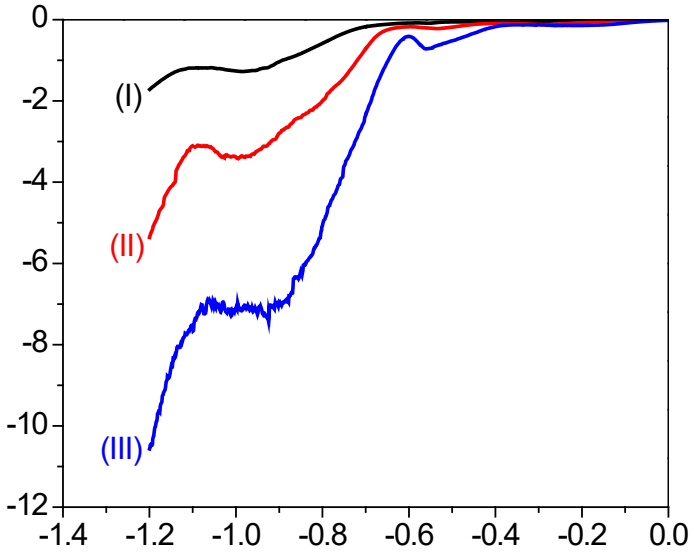

Figure S4. LSV curves CoFe electrodepositions in DES at different temperatures (I): 70, (II): 100, (III): 130 ºC, with 15 mM $CoCl_2$ + 85 mM $FeCl_3$. The scan rate was fixed at 1 mV/s.

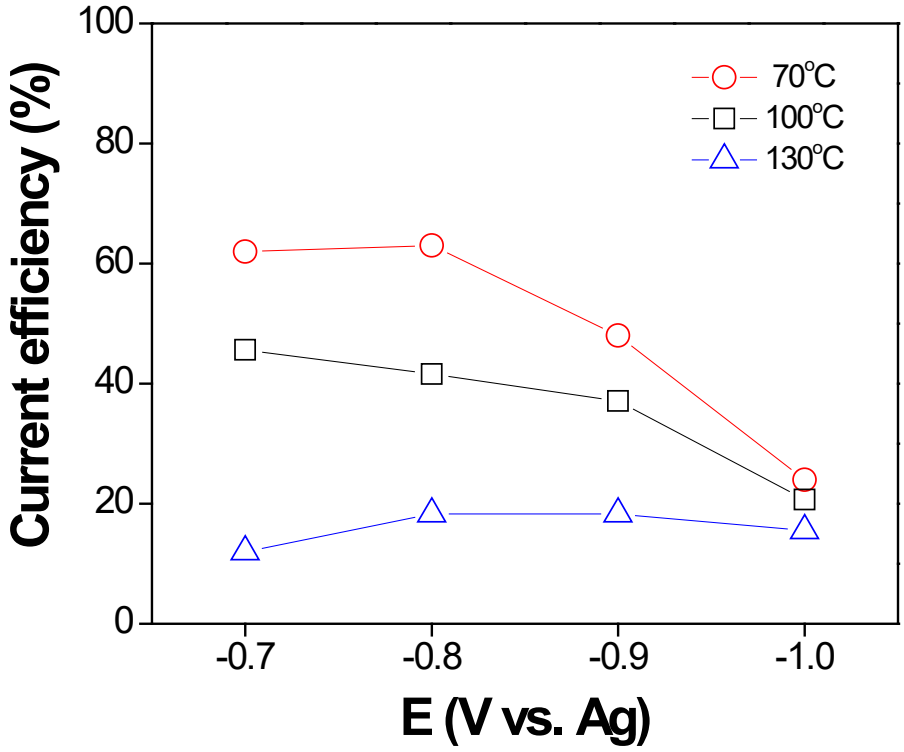

Figure S5. Current efficiency of CoFe film electrodeposited at different applied potential. The electrolyte consisted of 15 mM $CoCl_2$ + 85 mM $FeCl_3$.

Table S.1. Comparison of the magnetic properties of electrodeposited FeCo thin films from both aqueous and deep eutectic solvents baths.

Bath Type	***Fe content (at%)***	***Saturation Magnetization (M_s) (T)***	***Coercivity (Hc) (Oe)***	***Reference***
Aqueous	*60 - 80*	*1.8 – 2.4*	*50 – 250*	*Zhou et al., 2012*
Aqueous (Nanowires)	*70*	*~2.3*	*<100*	*DTIC Report, 2025*
Aqueous	*10 - 90*	*1.5 – 2.3*	*60 – 300*	*Gonçalves et al., 2023*
Aqueous	*65*	*2.1*	*80*	*Rahman et al., 2007*
Aqueous	*70*	*2.2*	*100*	*Ricq et al., 2001*
Aqueous	*0 - 10*	*1.8 to 2.4*	*8 to 12*	*Liao, 1987*
Aqueous	*0 - 80*	*2.3 to 1.5*	*20 - 62*	*Myung et al, 2004*
Aqueous	*55*	*2.2*	*30 – 60*	*Osaka et al., 1998*
Aqueous	*70*	*2.0*	*60 – 90*	*Lallemand et al., 2005*
Non-Aqueous (DES)	*75*	*1.9*	*50 – 100*	*Doneux et al., 2024*
Non-Aqueous (DES)	*65-85*	*0.8-1.74*	*290-350*	*Side et al., 2019*
Non-Aqueous (DES)	*30-40*	*0.2-1.6*	*50 – 250*	*This work*

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