Fig 1. Molecular structure of 2-(4-(2-hydroxyethyl)-1-piperazinyl) ethanesulfonic acid (HEPES).
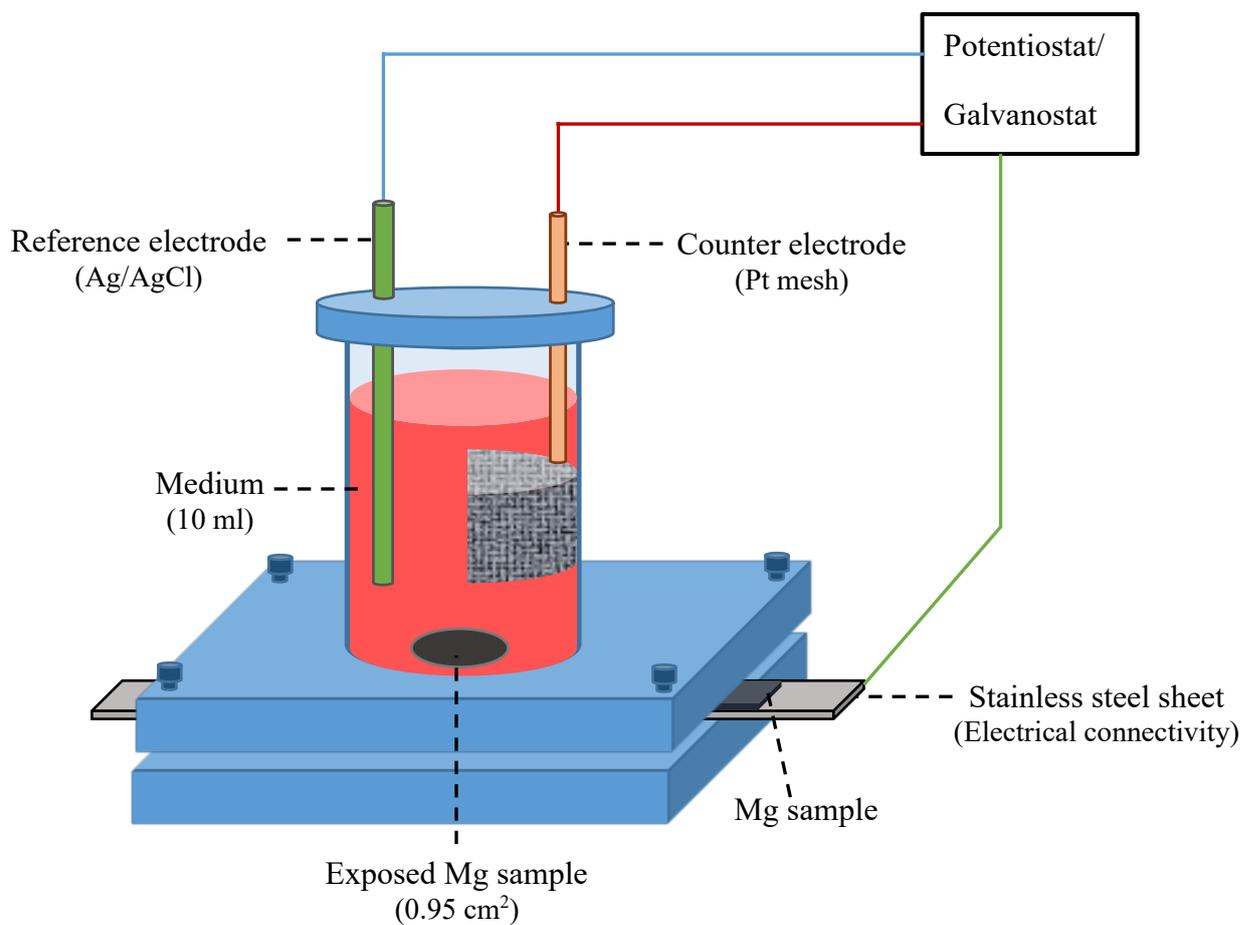

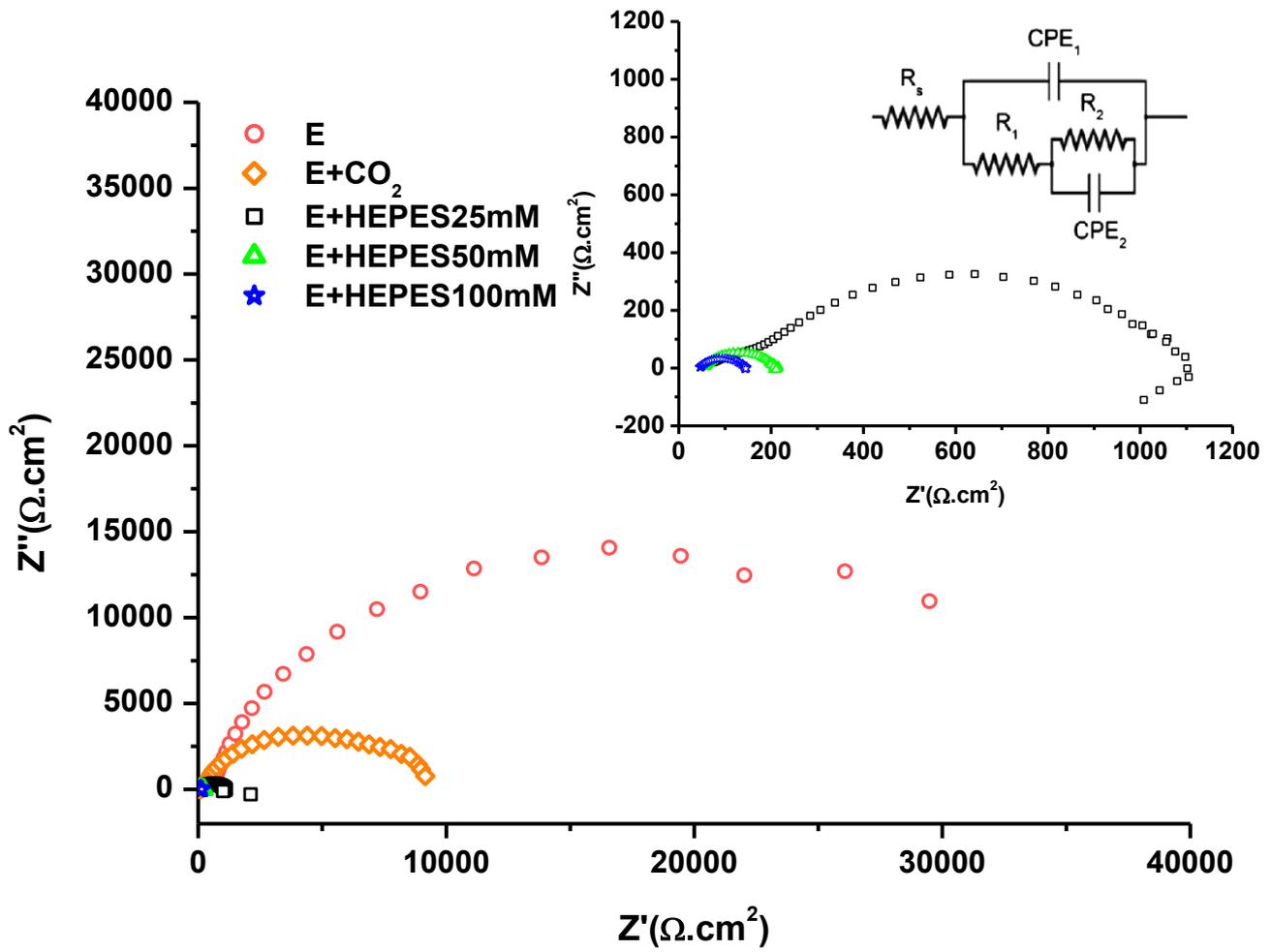**Fig.2.** Schematic of the electrochemical cell using in this study.

Fig 3. Nyquist plots of pure magnesium in different medium, and in the inset is the equivalent circuit used for modelling of impedance data. *(Note: EBSS is denoted as E)*.
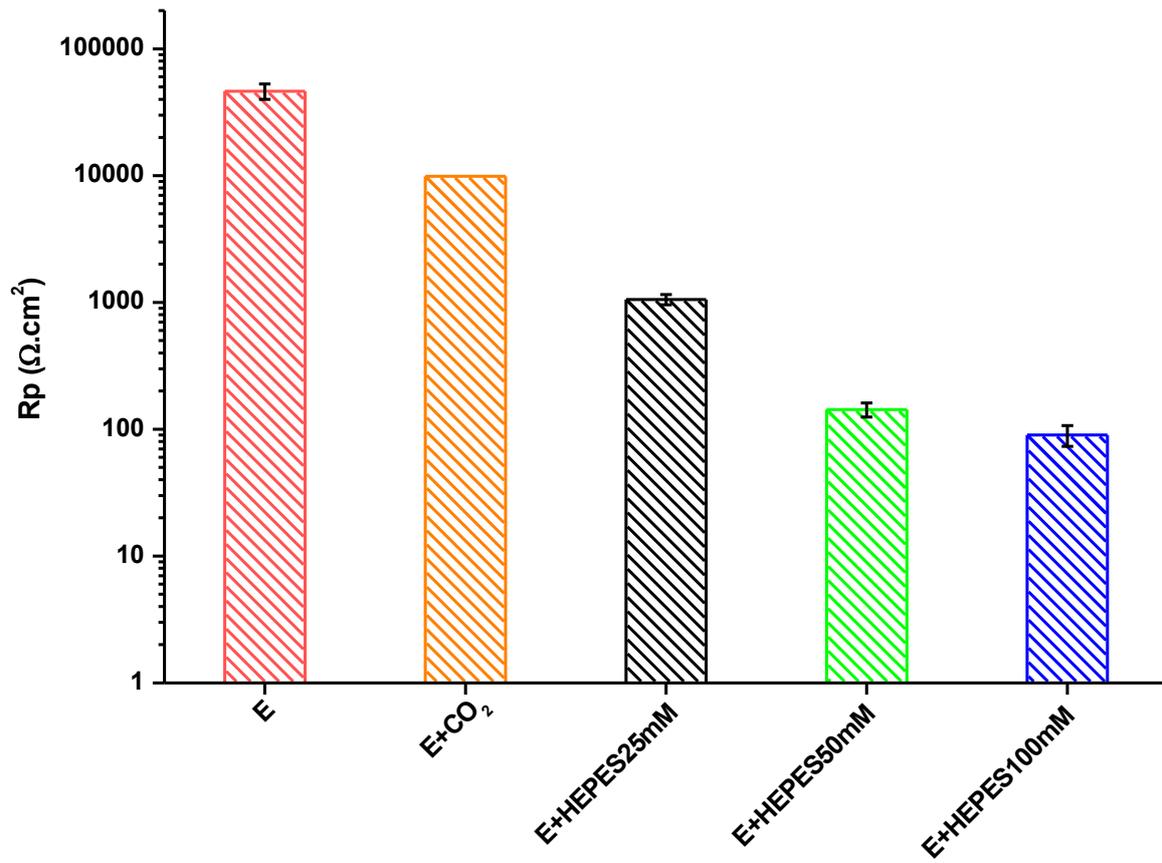
Fig 4. Polarization resistance (R_p) of pure magnesium in different medium. (*Note: EBSS is denoted as E*)
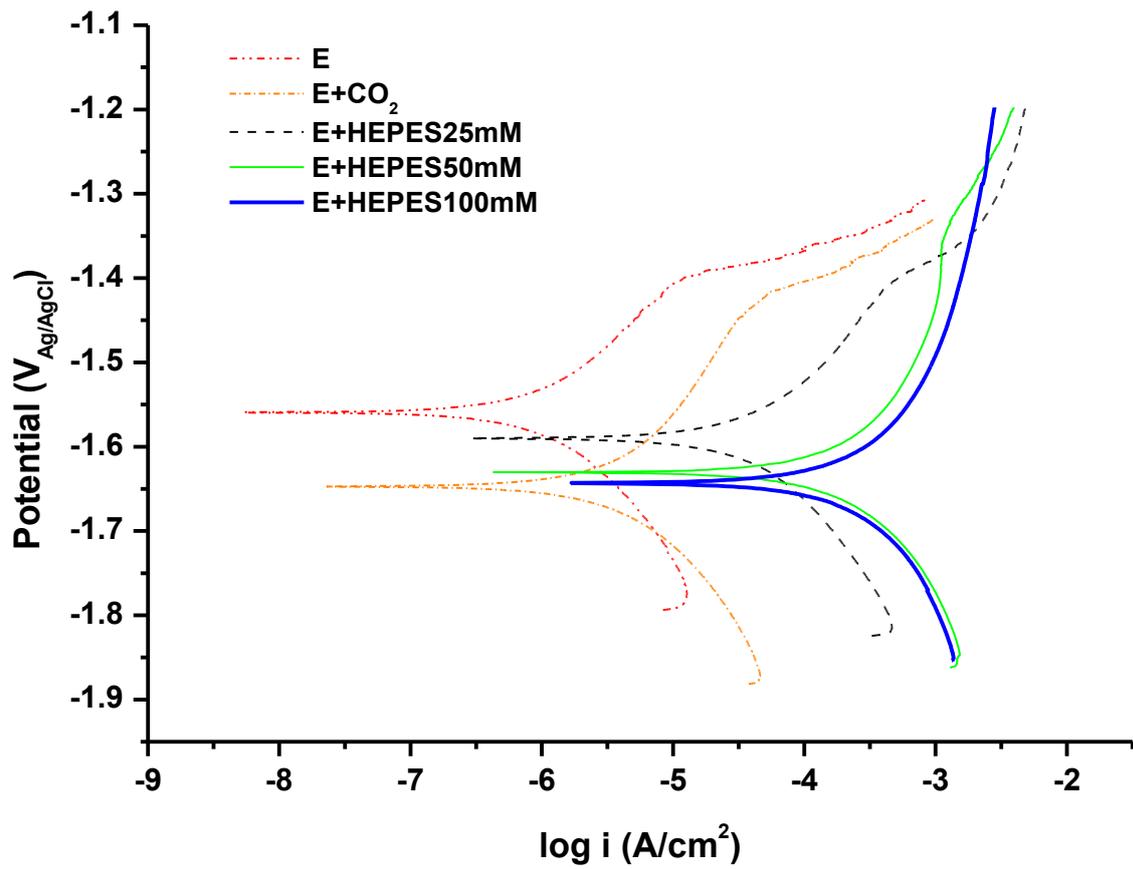
Fig. 5. Potentiodynamic curves of pure magnesium in different medium. (*Note: EBSS is denoted as E*).
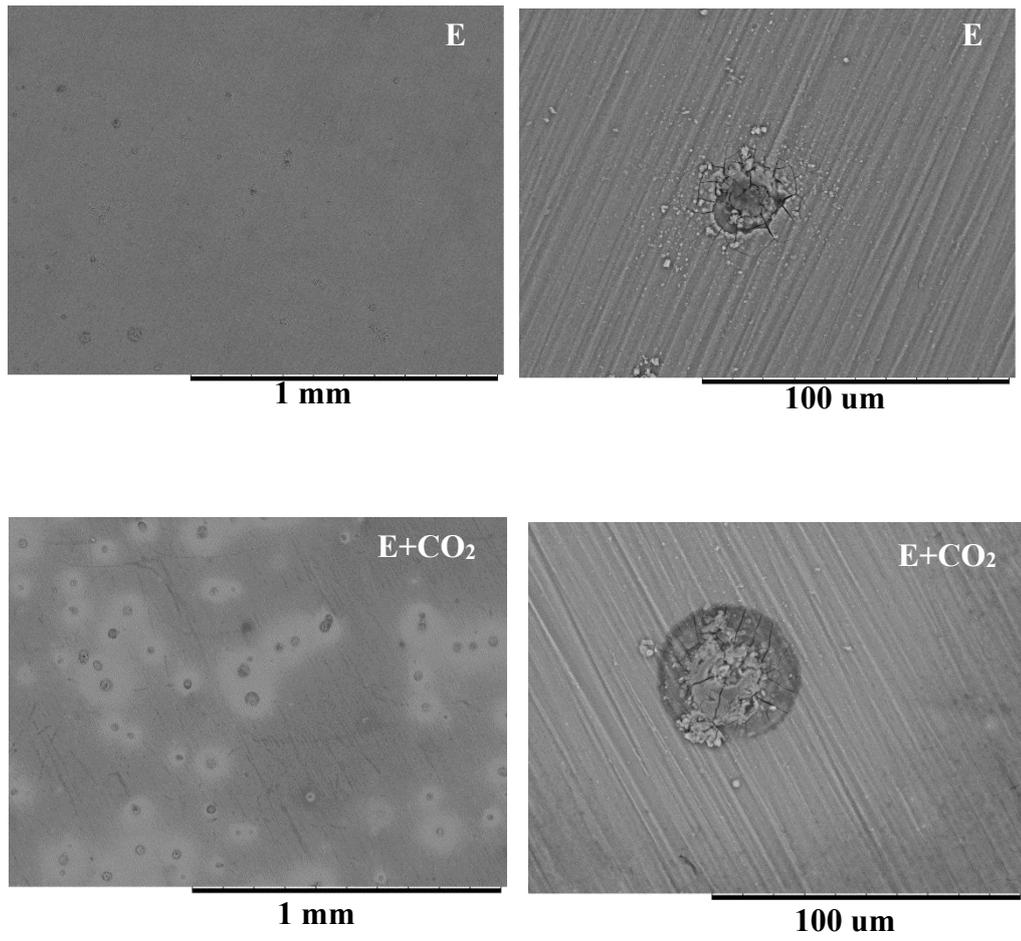
Fig. 6. SEM micrographs of pure magnesium in EBSS and EBSS+CO₂ medium. (*Note: EBSS is denoted as E*)
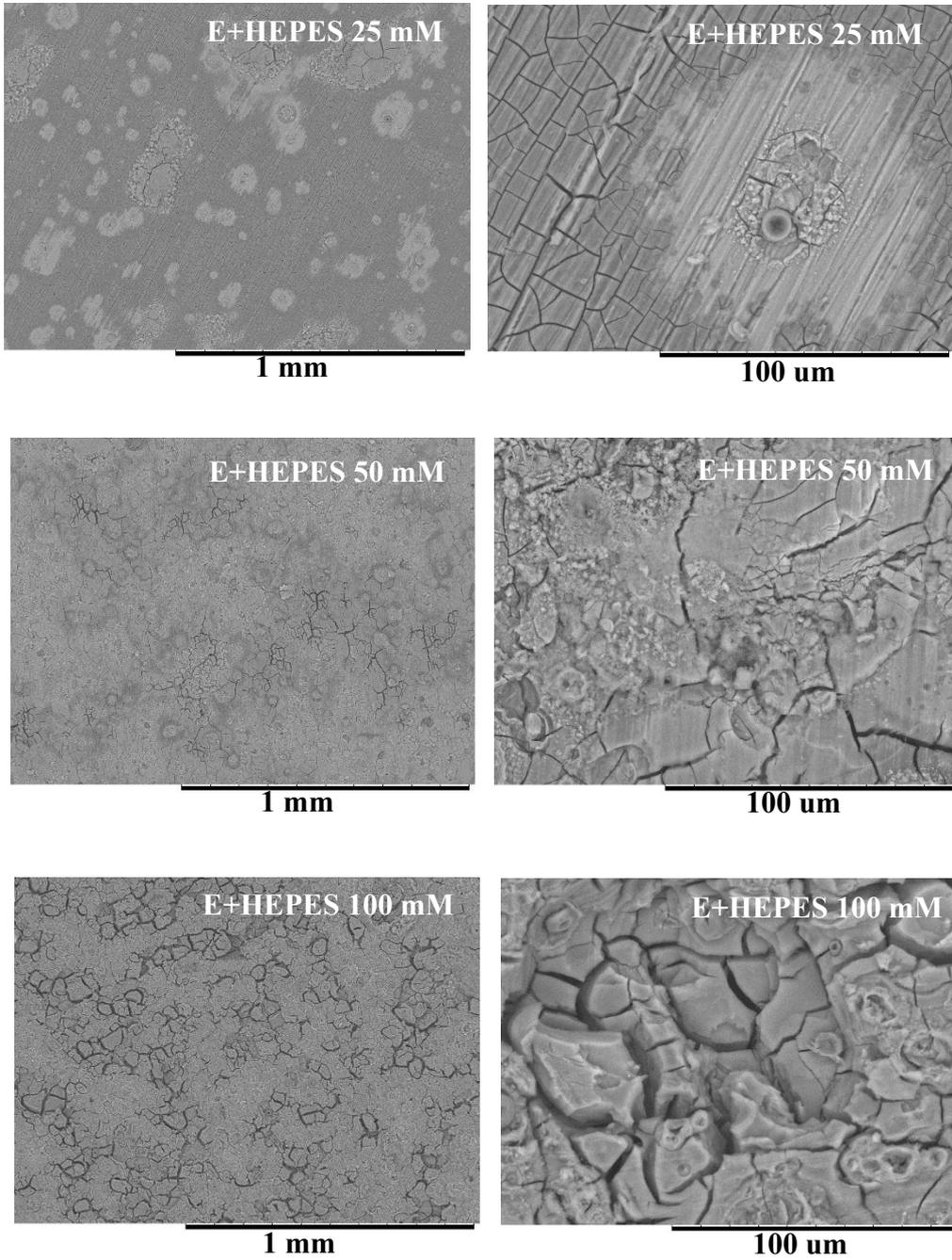
Fig. 7. SEM micrographs of pure magnesium in EBSS with different HEPES concentrations. (*Note: EBSS is denoted as E*)
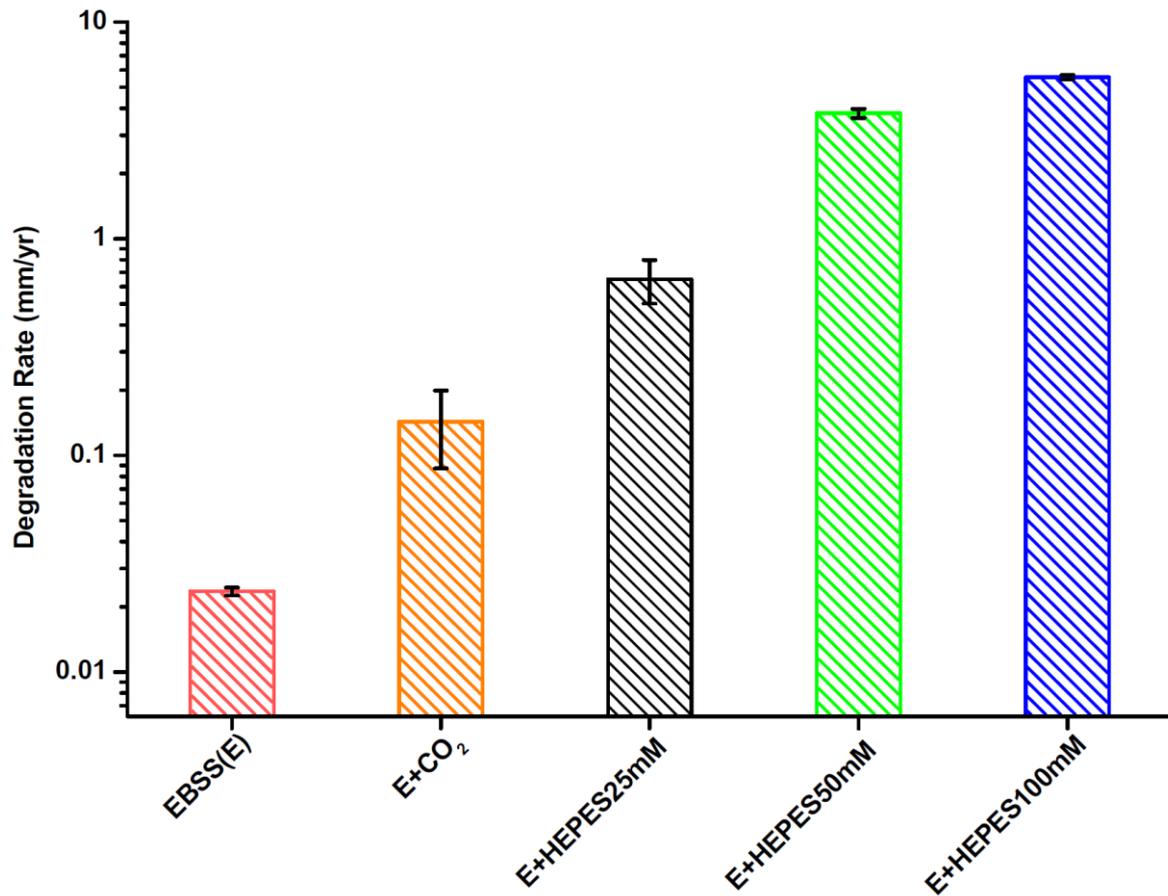
Fig. 8. Degradation rate of pure magnesium in different medium. (*Note: EBSS is denoted as E*).
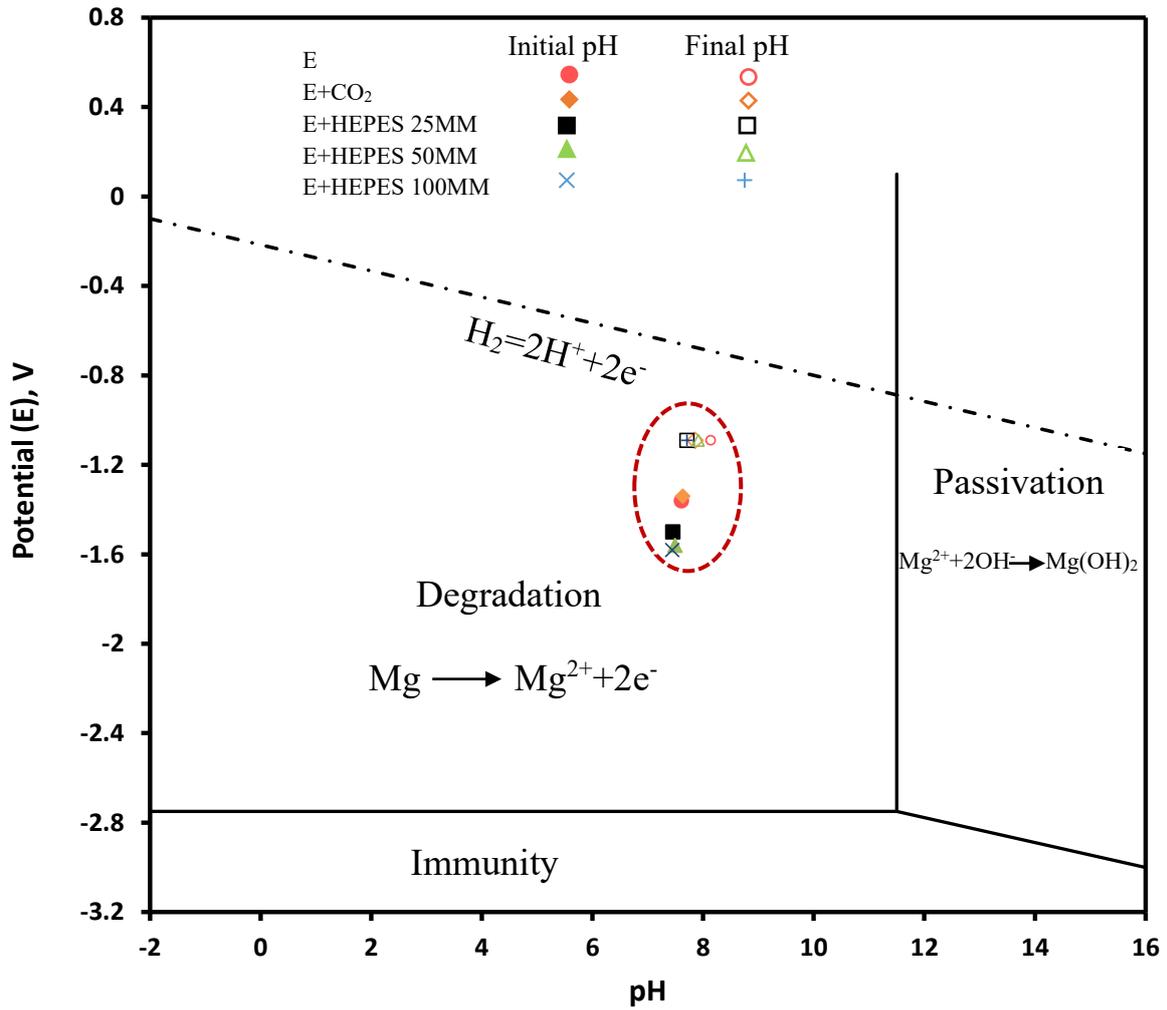
Fig. 9. Potential and pH data obtained before and after potentiodynamic polarization are mapped on the Potential-pH (Pourbaix) diagram of magnesium in aqueous solution. (*Note: EBSS is abbreviated as E*)