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**Fig.1.** Potentiodynamic polarization of (a)  $E_{11}N_4$  and (b)  $E_{11}N_6$  for the carbon steel in formation water containing sulfide ions in the absence and presence of various concentrations at 25°C.



**Fig.2.** Nyquist plot of(a)  $E_{11}N_4$  and (b)  $E_{11}N_6$  for the carbon steel in formation water containing sulfide ions in the absence and presence of different concentrations at 25°C.



**Fig.3.** Bode plot of(a)  $E_{11}N_4$  and (b)  $E_{11}N_6$  for the carbon steel in formation water containing sulfide ions in the absence and presence of different concentrations at 25°C.