TABLE III: DISSOLUTION DATA OBTAINED FROM THE ELECTROCHEMICAL TESTS PERFORMED ON ANKA SULPHIDE ORE IN 1 M HNO_3 + H_2O_2 AT VARYING MOLARITY

Molarity of HNO_3 (M)	Molarity of H_2O_2(M)	Icorr (A/cm²)	Ecorr (V)	Dissolution rate (mm/yr)
1	1	7.75E-05	4.64E-01	1.06E+00
1	0.75	6.80E-05	3.27E-01	9.318-01
1	0.5	5.034-5	5.34E-01	6.902-01
1	0.25	3.87E+00	5.37E-01	5.31E-01
1	None	2.51E-05	5.36E-01	3.44E-01

IV. CONCLUSION

Comparative effects of acidified hydrogen peroxide on dissolution behaviour of Anka complex sulphide mineral for advanced materials application. The electrolytes used were HCl and HNO_3 plus H_2O_2. Open circuit potential, potentiodynamic polarization and Chronoamperometric methods were electrochemical methods were applied in this investigation. Mineralogical analysis revealed that the mineral contain some base metals (Pb, Zn, Fe, and Cu) which can be extracted for engineering purposes. It was discovered that addition of H_2O_2 enhances dissolution of Anka complex sulphide ore and optimum dissolution rate were obtained with 1 M HNO_3 + 1 M H_2O_2. Potentiodynamic polarization curves show that behaviour of the mineral with HCl and HNO_3 plus H_2O_2 were similar in the sense that dissolution potentials shifted negatively as concentration of H_2O_2 increases from 0.25 M to 1 M. Chronoamperometric behaviour of the mineral show that dissolution kinetics decrease with increase in time up to 7200 seconds for the various applied potentials [19]. The dissolution data obtained from electrochemical tests show that the presence of hydrogen peroxide enhance dissolution with HCl and HNO_3; dissolution rates increase with increase in molarity of H_2O_2 (up to 1 M) plus 1 M HCl and HNO_3 Respectively. Highest dissolution rate of 1.066+00 mm/yr was obtained from HNO_3 plus I M H_2O_2. Nitric acid has higher tendency to dissolve Anka sulphide ore than hydrochloric acid especially when it is added to hydrogen peroxide. It has been ascertained that hydrogen peroxide and nitric acid solutions have considerable positive effects on the dissolution of Sphalerite ores [20].

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