EFFECT OF HYDROGEN PEROXIDE AND LEAD NITRATE IN THE CYANIDATION LEACHING OF GOLD ORE SAMPLE

by

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LIST ABBREVIATIONS

µg/g	Microgram per gram
µm	Micrometer
2FI	2 Factor Interaction
2Θ	2 theta (Scanning Range)
ANOVA	Analysis of Varians
Apy	Arsenopyrite
ASTM	American Society for Testing & Materials
BF	Bright Field
C	Percent Gold Extracted
CCD	Central Composite Design
CHNS	Carbon Hydrogen Nitrogen Sulfur
DF	Dark Field
EDX	Energy Dispersive X-Ray
F	Iron Oxides
FAAS	Flame Atomic Absorption Spectrometry
gt^{-1}	Gram per Tonne
ICDD	International Centre for Diffraction Data
ICP-OES	Inductive Coupled Plasma – Optical Emission Spectrometry
k	Rate Constant
L	Litre
M	Molarity
N	Total Number of Experiment
n	Number of factor under-studied

NAA	Neutron Activation Analysis
n_c	Number of Center Point
Pb-FA	Lead Fire Assay
ppm	Part per Million
PRESS	Prediction Sum of Square
Qz	Quartz
R^2	Coefficient-Correlation
RSM	Respond Surface Methodology
s	Second
S:L	Solid Liquid Ratio
SEM	Scanning Electron Microscope
t	Time
V	Rate percent gold extracted
vs	Versus
X	Independent Variable
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence
XRM	X-Ray Mapping
y	Respond
Wt %	Weight Percent

LIST OF SYMBOLS

%	Percentage
<	Less Than
>	More Than
[ ]	Concentration
~	Approximately
^{o}C	Degree of Celsius
β	Chemical Stability Constant
Ɛ °	Standard Potential
∫	Integration

KESAN HIDROGEN PEROKSIDA DAN PLUMBUM NITRAT DALAM PELARUTLESAPAN SIANIDA BAGI SAMPEL BIJIH EMAS

ABSTRAK

Bijih Au yang digunakan diperolehi daripada lombong bijih Au di Malaysia. Dalam proses pelarutlesapan sianida, keboleh-ekstrakan Au bergantung kepada sifat semulajadi bijih. Maka dengan itu, pencirian bijih melalui kajian mineralogi merupakan peringkat yang penting sebelum pengekstrakan Au. Kehadiran Fe, As, dan S telah dikesan dan taburan halus partikel Au dengan butiran bersaiz 10.0 µm didapati terperangkap dalam fasa aluminosilikat. Au yang hadir (Au pukal yang larut - boleh ekstrak) dalam bijih bebas kisar dan refraktori telah ditentukan melalui kaedah pensianidaan diikuti dengan cerakin api. Sebanyak 1.9368 g/t Au terekstrak. Bijih Au ini tidak mudah diekstrakkan dengan kaedah pensianidaan lazim disebabkan oleh kesan perencatan yang disebabkan oleh mineral sulfida. Oleh itu, H_2O_2 digunakan sebagai sumber O_2 dan $Pb(NO_3)_2$ telah ditambah untuk menstabilkan Cu dan Fe daripada menjadikan permukaan Au itu pasif terhadap sianida. Ujian awal pensianidaan dijalankan pada pH 11 dengan 33.3 % pepejal sebelum kajian pengoptimaan menggunakan kaedah respon permukaan-rekabentuk komposit berpusat. Rangkuman jarak keadaan optimum adalah pada 467.3 ppm NaCN, 94.96 ppm $Pb(NO_3)_2$ dan 0.01M H_2O_2, dengan 1.7231 g/t (88.97%) Au terekstrak selepas menggunakan kaedah kenaikan mendadak. Pensianidaan lazim cuma boleh mengekstrak 62.02% Au, dimana ini menunjukkan $Pb(NO_3)_2$ and H_2O_2 membantu dalam pelarutan Au sianida. Dari kaedah perbezaan Van't Hoff, tertib tindakbalas adalah tertib kedua dengan pemalar kadar 0.501/jam. Kompleks auro yang terbentuk

daripada tindakbalas pensianidaan adalah bergantung kepada kepekatan sianida dan O_2 terlarut dari H_2O_2.