

Supplementary Materials

Study of an Environmentally Friendly Method for the Dissolution of Precious Metal with Ionic Liquid and Iodoalkane

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Table S1. The leaching yield variation with time.

Time/min	Dissolved Gold Mass/ μg	Leaching Yield/%
0	0.00	0.00
30	648.43	10.73
60	1304.83	21.59
90	1751.63	28.99
120	2350.75	38.90
150	3078.63	50.95
180	3650.68	60.41
210	4159.83	68.84
240	4802.70	79.48
270	5564.85	92.09
300	5999.98	100.00

Reaction conditions: 25 °C, 13 W incandescent lamp irradiation, $\text{BmimN}(\text{CN})_2$ = 3 g, CHI_3 = 0.5g, gold = 0.006 g.

Table S2. SXRD result of the crystal.

BmimI	
Identification code	mo191202a
Empirical formula	C ₉ H ₁₆ I ₄ N ₂
Formula weight	659.84
Temperature/K	296.15
Crystal system	orthorhombic
Space group	P2 ₁ 2 ₁ 2 ₁
a/Å	10.168(5)
b/Å	13.039(6)
c/Å	13.253(6)
α/°	90
β/°	90
γ/°	90
Volume/Å ³	1757.1(14)
Z	4
Q _{calc} /cm ³	2.494
μ/mm ⁻¹	7.074
F(000)	1184
Crystal size/mm ³	0.15 × 0.15 × 0.12
Radiation	MoKα (λ = 0.71073)
2Θ range for data collection/°	4.382 to 60.274
Index ranges	−14 ≤ h ≤ 14, −18 ≤ k ≤ 18, −14 ≤ l ≤ 18
Reflections collected	15762
Independent reflections	4865 [R _{int} = 0.0381, R _{sigma} = 0.0399]
Data/restraints/parameters	4865/0/138
Goodness-of-fit on F ²	1.046
Final R indexes [I > 2σ (I)]	R ₁ = 0.0346, wR ₂ = 0.0666
Final R indexes [all data]	R ₁ = 0.0592, wR ₂ = 0.0752
Largest diff. peak/hole / e Å ⁻³	0.54/−1.12
Flack parameter	−0.04(4)

Table S3. XRF results of gold ore.

Entry I	Weight%	Entry II	Weight%
Fe	2.07	K	0.171
Ca	1.54	Na	0.121
Al	0.816	Cd	0.006
Mn	0.605	Se	0.0042
Cu	0.413	Ni	0.0013
Au		0.0244	

Table S4. XRF result of gold catalyst.

Entry I	Weight%	Entry II	Weight%
Si	45.35	Ca	0.277
Px	0.467	Al	0.121
Na	0.36	Mg	0.115
Au 0.381			

Table S5. XRF results of catalyst before and after Soxhlet extraction.

Before Soxhlet Extraction		After Soxhlet Extraction	
EI	Weight%	EI	Weight%
Si	42.6	Si	45.88
I	5.51	Na	0.377
Px	0.53	P	0.504
Na	0.411	Ca	0.27
Ca	0.253	Mg	0.105
Ti	0.166	Al	0.0668
Mg	0.12	Ti	0.027
K	0.14	Fe	0.0206
Al	0.0891	Cl	0.0201
Au	0.136	Zr	0.0111
Cl	0.0557	S	0.0133
Fe	0.0379	K	0.0107
Te	0.0241	Sn	0.0057
Pu	0.0264	Pr	0.0059

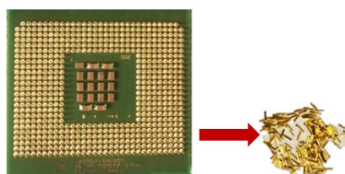

Figure S1. The gold ores utilized for the gold leaching.

Figure S2. The waste CPU pins utilized for the gold leaching.

Figure S3. The Au@SiO₂ catalyst utilized for the gold leaching.