Electrorefining of crude solder for production of fine solder in methanesulfonic acid medium: electrolyte conductivity and electrorefining process

Yuhui Zhang [a], Kunyun He [b, c], Bingjie Jin [b, 1], Jin Luan [b]

[a] School of Chemistry, Biology and Environment, Yuxi Normal University, 653100 Yuxi, Yunnan, P. R. China

[b] Faculty of Metallurgical and Energy Engineering, Kunming University of Science and Technology, 650093 Kunming, Yunnan, P. R. China

[c] Jiangxi Aviation Vocational and Technical College, 330000 Nanchang, Jiangxi, P. R. China

Supplementary Material

Table S1 Chemical composition of crude solder

Constituent (%)											
Sn	Pb	As	Cu	Fe	Ag	Sb	Zn	Al	Cd	In	Ni
79.29	17.7	0.0458	0.197	0.0059	0.0871	1.29	0.0015	0.003	0.0021	0.24	0.18

Table S2 List of process parameters studied during experiments

Studied parameters	Range	Fixed parameters
Current density (A/m^2)	137 - 230	tin concentration 130 g/L, free-MSA concentration 120 g/L, electrode spacing 4.0 cm, temperature 295.15 K, 4 h
Tin concentration (g/L)	90 - 180	current density 207 A/m^2, free-MSA concentration 120 g/L, electrode spacing 4.0 cm, temperature 295.15 K, 4 h
Free-MSA concentration (g/L)	30 - 120	current density 207 A/m^2, tin concentration 130 g/L, electrode spacing 4.0 cm, temperature 295.15 K, 4 h
Electrode spacing (cm)	2.5 - 7.0	current density 207 A/m^2, tin concentration 130 g/L, free-MSA concentration 100 g/L, temperature 295.15 K, 4 h
Temperature (K)	295.15 -	current density 207 A/m^2, tin concentration of 130 g/L,

[1] Corresponding author. Bingjie JIN, E-mail add.: jinbingjie18@163.com (B. JIN).

	323.15	free-MSA concentration 100 g/L, electrode spacing 4 cm, 4 h

Table S3 Chemical composition of fine solder (%)

Element	Sn	Pb	As	Cu	Fe	Ag	Sb	Zn	Al	In	Ni
Content	98.42	1.57	0.0004	<0.001	0.0008	<0.002	0.0005	0.0002	0.0003	0.0005	0.0004