

Supplementary files

Table S1 Collected amount of research articles related to metal criticality until March 2022

Element	Total amount	Reference
Ag	3	(Nassar et al., 2012; Graedel et al., 2015; Yan et al., 2021)
Al	4	(Nassar et al., 2012; Ciacci et al., 2016; Eheliyagoda et al., 2020; Yan et al., 2021)
As	3	(Nassar et al., 2012; Graedel et al., 2015; Yan et al., 2021)
Au	2	(Nassar et al., 2012; Graedel et al., 2015)
B	2	(Graedel et al., 2015; Yan et al., 2021)
Ba	2	(Graedel et al., 2015; Panousi et al., 2016)
Be	2	(Graedel et al., 2015; Yan et al., 2021)
Bi	4	(Graedel et al., 2015; Glöser-Chahoud et al., 2016; Panousi et al., 2016; Yan et al., 2021)
Cd	2	(Graedel et al., 2015; Harper et al., 2015b)
Ce	2	(Graedel et al., 2015; Nassar et al., 2015)
Co	2	(Graedel et al., 2015; Yan et al., 2021)
Cr	3	(Nuss et al., 2014; Graedel et al., 2015; Yan et al., 2021)
Cs	1	(Yan et al., 2021)
Cu	9	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Nassar et al., 2012; Graedel et al., 2015; Ciacci et al., 2016; Eheliyagoda et al., 2020; Helbig et al., 2021; Yan et al., 2021)
Dy	3	(Rademaker et al., 2013; Graedel et al., 2015; Nassar et al., 2015)
Er	2	(Graedel et al., 2015; Nassar et al., 2015)
Eu	2	(Graedel et al., 2015; Nassar et al., 2015)
Fe	3	(Nuss et al., 2014; Graedel et al., 2015; Ciacci et al., 2016)
Ga	5	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Yan et al., 2021)
Gd	2	(Graedel et al., 2015; Nassar et al., 2015)
Ge	4	(Graedel et al., 2015; Harper et al., 2015b; Glöser-Chahoud et al., 2016; Yan et al., 2021)
Hf	2	(Graedel et al., 2015; Harper et al., 2015a)
Hg	3	(Graedel et al., 2015; Panousi et al., 2016; Yan et al., 2021)
Ho	2	(Graedel et al., 2015; Nassar et al., 2015)
In	8	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Harper et al., 2015b; Ciacci et al., 2016; Helbig et al., 2021; Yan et al., 2021)
La	2	(Graedel et al., 2015; Nassar et al., 2015)
Ir	1	(Graedel et al., 2015)
Li	5	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Yan et al., 2021)
Lu	2	(Graedel et al., 2015; Nassar et al., 2015)
Mg	3	(Graedel et al., 2015; Glöser-Chahoud et al., 2016; Yan et al., 2021)

Mn	6	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Nuss et al., 2014; Graedel et al., 2015; Yan et al., 2021)
Mo	2	(Graedel et al., 2015; Yan et al., 2021)
Nb	6	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Nuss et al., 2014; Graedel et al., 2015; Yan et al., 2021)
Nd	3	(Rademaker et al., 2013; Graedel et al., 2015; Nassar et al., 2015)
Ni	3	(Graedel et al., 2015; Ciacci et al., 2016; Yan et al., 2021)
Os	1	(Graedel et al., 2015)
Pb	2	(Graedel et al., 2015; Harper et al., 2015b)
Pd	5	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Glöser-Chahoud et al., 2016)
Pr	2	(Graedel et al., 2015; Nassar et al., 2015)
Pt	6	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Glöser-Chahoud et al., 2016; Yan et al., 2021)
Rb	1	(Yan et al., 2021)
Re	2	(Graedel et al., 2015; Yan et al., 2021)
Rh	4	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015)
Ru	1	(Graedel et al., 2015)
Sb	3	(Graedel et al., 2015; Panousi et al., 2016; Yan et al., 2021)
Sc	2	(Graedel et al., 2015; Panousi et al., 2016)
Se	3	(Nassar et al., 2012; Graedel et al., 2015; Yan et al., 2021)
Si	1	(Yan et al., 2021)
Sm	2	(Graedel et al., 2015; Nassar et al., 2015)
Sn	3	(Graedel et al., 2015; Harper et al., 2015b; Yan et al., 2021)
Sr	3	(Graedel et al., 2015; Panousi et al., 2016; Yan et al., 2021)
Ta	2	(Graedel et al., 2015; Yan et al., 2021)
Tb	2	(Graedel et al., 2015; Nassar et al., 2015)
Te	3	(Nassar et al., 2012; Graedel et al., 2015; Yan et al., 2021)
Th	2	(Graedel et al., 2015; Harper et al., 2015a)
Ti	5	(National-Research-Council, 2008; European-Commission, 2010; Erdmann and Graedel, 2011; Graedel et al., 2015; Glöser-Chahoud et al., 2016)
Tl	2	(Graedel et al., 2015; Panousi et al., 2016)
Tm	2	(Graedel et al., 2015; Nassar et al., 2015)
U	2	(Graedel et al., 2015; Harper et al., 2015a)
V	3	(Nuss et al., 2014; Graedel et al., 2015; Yan et al., 2021)
W	3	(Graedel et al., 2015; Glöser-Chahoud et al., 2016; Yan et al., 2021)
Y	2	(Graedel et al., 2015; Nassar et al., 2015)
Yb	2	(Graedel et al., 2015; Nassar et al., 2015)
Zn	4	(Graedel et al., 2015; Harper et al., 2015b; Ciacci et al., 2016; Yan et al., 2021)
Zr	2	(Harper et al., 2015a; Yan et al., 2021)

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