Electrochemical Series (ECS)

Table 19.3

Electrochemical series of metals

Metal ion				Metal	
$K^+(aq)$	+ e^-	⇌		$K(s)$	
$Ca^{2+}(aq)$	+ $2e^-$	⇌		$Ca(s)$	order is the reverse of that in the reactivity series
$Na^+(aq)$	+ e^-	⇌		$Na(s)$	
$Mg^{2+}(aq)$	+ $2e^-$	⇌		$Mg(s)$	
$Al^{3+}(aq)$	+ $3e^-$	⇌		$Al(s)$	
$Zn^{2+}(aq)$	+ $2e^-$	⇌		$Zn(s)$	
$Fe^{2+}(aq)$	+ $2e^-$	⇌		$Fe(s)$	
$Pb^{2+}(aq)$	+ $2e^-$	⇌		$Pb(s)$	
$2H^+(aq)$	+ $2e^-$	⇌		$H_2(g)$	
$Cu^{2+}(aq)$	+ $2e^-$	⇌		$Cu(s)$	
$Ag^+(aq)$	+ e^-	⇌		$Ag(s)$	
$Au^+(aq)$	+ e^-	⇌		$Au(s)$	

Decreasing tendency to form ions

More reactive metals (K,Ca,Na…) have a higher tendency to lose electrons. They usually undergo oxidation. They are strong reducing agents, they have strong reducing power.

Ions of more reactive metals (K^+,Ca^{2+},Na^+) have a lower tendency to gain electrons. They seldom undergo reduction. They are weak oxidizing agents, they have weak oxidizing power.

Less reactive metals (Au,Ag,Cu…) have a lower tendency to lose electrons. They seldom undergo oxidation. They are weak reducing agents, they have weak reducing power.

Ions of more reactive metals (Au^+,Ag^+,Cu^{2+}) have a higher tendency to gain electrons. They usually undergo reduction. They are strong oxidizing agents, they have strong oxidizing power.