



reactions	+ cold water	+ steam	+ dilute acid HCl	
K	Very violently	explosively	explosively	
Na	Violently	explosively	explosively	
Ca	Readily	Very violently	violently	
Mg	Very slowly	Violently	rapidly	
Zn	No reaction	readily	moderately	
Fe		slowly	slowly	
Pb		No reaction	No reaction	No reaction
H				
Cu				
Ag				
Au				

electrolysis ←

Reduction with carbon ←

- Metal + cold water >>> metal hydroxide + H₂
- Metal + steam >>> metal oxide + H₂
- Metal + HCl >>> metal chloride + H₂

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	Reducing agent			Thermal decomposition of metal carbonates		
	+ carbon	+ hydrogen				
K	No reaction	No reaction	K	Unaffected by heat		
Na			Na			
Ca			Ca	Metal carbonate >> metal oxide + CO ₂ CaCO ₃ >>> CaO + CO ₂		
Mg			Mg			
C			Metal oxide + C >> Metal + CO ₂ ZnO + C >>> Zn + CO ₂		Metal oxide + H ₂ >> metal + steam CuO + H ₂ >>> Cu + H ₂ O	Zn
Zn						Fe
Fe	Pb					
Pb	Cu					
Cu	Ag	Decompose into silver and CO ₂				
Ag						

Rusting with oxygen and water

- barrier methods (painting, oiling/greasing and coating with plastic)
- **sacrificial protection** (Zn or Mg)
(As Zn or Mg are more reactive than Fe, so Zn or Mg will react with oxygen and water to corrode instead of Fe)

Displacement reactions:
A more reactive metal can **displace** a less reactive metal from its salt solution.
Fe(s) + CuSO₄(aq) >>> Cu(s) + FeSO₄(aq)
(blue) (green)

Observation:

- Solution turn from blue to green
- Reddish-brown solids formed

Explanation:
Since iron is more reactive than copper, iron atoms become iron(II) ions more readily and displace copper from copper(II) sulfate solution.