Relative Strengths of Oxidizing and Reducing Agents

SOA
Strongest Oxidizing Agent

Decreasing Strength of Oxidizing Agents

Oxidizing Agents			Reducing Agents	$E°_r$ (V)
$F_{2(g)}$	$+ 2e^-$	$\rightleftharpoons$	$2F^-_{(aq)}$	+2.87
$PbO_{2(s)} + SO_{4(aq)}^{2-} + 4H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$PbSO_{4(s)} + 2H_2O_{(l)}$	+1.69
$MnO^-_{4(aq)} + 8H^+_{(aq)}$	$+ 5e^-$	$\rightleftharpoons$	$Mn^{2+}_{(aq)} + 4H_2O_{(l)}$	+1.51
$Au^{3+}_{(aq)}$	$+ 3e^-$	$\rightleftharpoons$	$Au_{(s)}$	+1.50
$ClO^-_{4(aq)} + 8H^+_{(aq)}$	$+ 8e^-$	$\rightleftharpoons$	$Cl^-_{(aq)} + 4H_2O_{(l)}$	+1.39
$Cl_{2(g)}$	$+ 2e^-$	$\rightleftharpoons$	$2Cl^-_{(aq)}$	+1.36
$2HNO_{2(aq)} + 4H^+_{(aq)}$	$+ 4e^-$	$\rightleftharpoons$	$N_2O_{(g)} + 3H_2O_{(l)}$	+1.30
$Cr_2O_{7(aq)}^{2-} + 14H^+_{(aq)}$	$+ 6e^-$	$\rightleftharpoons$	$2Cr^{3+}_{(aq)} + 7H_2O_{(l)}$	+1.23
$O_{2(g)} + 4H^+_{(aq)}$	$+ 4e^-$	$\rightleftharpoons$	$2H_2O_{(l)}$	+1.23
$MnO_{2(s)} + 4H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Mn^{2+}_{(aq)} + 2H_2O_{(l)}$	+1.22
$2IO^-_{3(aq)} + 12H^+_{(aq)}$	$+ 10e^-$	$\rightleftharpoons$	$I_{2(s)} + 6H_2O_{(l)}$	+1.20
$Br_{2(l)}$	$+ 2e^-$	$\rightleftharpoons$	$2Br^-_{(aq)}$	+1.07
$Hg^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Hg_{(l)}$	+0.85
$ClO^-_{(aq)} + H_2O_{(l)}$	$+ 2e^-$	$\rightleftharpoons$	$Cl^-_{(aq)} + 2OH^-_{(aq)}$	+0.84
$Ag^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Ag_{(s)}$	+0.80
$NO^-_{3(aq)} + 2H^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$NO_{2(g)} + H_2O_{(l)}$	+0.80
$Fe^{3+}_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Fe^{2+}_{(aq)}$	+0.77
$O_{2(g)} + 2H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_2O_{2(l)}$	+0.70
$MnO^-_{4(aq)} + 2H_2O_{(l)}$	$+ 3e^-$	$\rightleftharpoons$	$MnO_{2(s)} + 4OH^-_{(aq)}$	+0.60
$I_{2(s)}$	$+ 2e^-$	$\rightleftharpoons$	$2I^-_{(aq)}$	+0.54
$Cu^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Cu_{(s)}$	+0.52
$O_{2(g)} + 2H_2O_{(l)}$	$+ 4e^-$	$\rightleftharpoons$	$4OH^-_{(aq)}$	+0.40
$Cu^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Cu_{(s)}$	+0.34
$SO_{4(aq)}^{2-} + 4H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_2SO_{3(aq)} + H_2O_{(l)}$	+0.17
$Sn^{4+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Sn^{2+}_{(aq)}$	+0.15
$Cu^{2+}_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Cu^+_{(aq)}$	+0.15
$S_{(s)} + 2H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_2S_{(aq)}$	+0.14
$AgBr_{(s)}$	$+ e^-$	$\rightleftharpoons$	$Ag_{(s)} + Br^-_{(aq)}$	+0.07
$2H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_{2(g)}$	0.00
$Pb^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Pb_{(s)}$	−0.13
$Sn^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Sn_{(s)}$	−0.14
$AgI_{(s)}$	$+ e^-$	$\rightleftharpoons$	$Ag_{(s)} + I^-_{(aq)}$	−0.15
$Ni^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Ni_{(s)}$	−0.26
$Co^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Co_{(s)}$	−0.28
$H_3PO_{4(aq)} + 2H^+_{(l)}$	$+ 2e^-$	$\rightleftharpoons$	$H_3PO_{3(aq)} + H_2O_{(l)}$	−0.28
$PbSO_{4(s)}$	$+ 2e^-$	$\rightleftharpoons$	$Pb_{(s)} + SO_{4(aq)}^{2-}$	−0.36
$Se_{(s)} + 2H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_2Se_{(aq)}$	−0.40
$Cd^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Cd_{(s)}$	−0.40
$Cr^{3+}_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Cr^{2+}_{(aq)}$	−0.41
$Fe^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Fe_{(s)}$	−0.44
$Ag_2S_{(s)}$	$+ 2e^-$	$\rightleftharpoons$	$2Ag_{(s)} + S^{2-}_{(aq)}$	−0.69
$Zn^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Zn_{(s)}$	−0.76
$Te_{(s)} + 2H^+_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$H_2Te_{(aq)}$	−0.79
$2H_2O_{(l)}$	$+ 2e^-$	$\rightleftharpoons$	$H_{2(g)} + 2OH^-_{(aq)}$	−0.83
$Cr^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Cr_{(s)}$	−0.91
$SO_{4(aq)}^{2-} + H_2O_{(l)}$	$+ 2e^-$	$\rightleftharpoons$	$SO_{3(aq)}^{2-} + 2OH^-_{(aq)}$	−0.93
$Al^{3+}_{(aq)}$	$+ 3e^-$	$\rightleftharpoons$	$Al_{(s)}$	−1.66
$Mg^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Mg_{(s)}$	−2.37
$Na^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Na_{(s)}$	−2.71
$Ca^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Ca_{(s)}$	−2.87
$Ba^{2+}_{(aq)}$	$+ 2e^-$	$\rightleftharpoons$	$Ba_{(s)}$	−2.91
$K^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$K_{(s)}$	−2.93
$Li^+_{(aq)}$	$+ e^-$	$\rightleftharpoons$	$Li_{(s)}$	−3.04

Decreasing Strength of Reducing Agents

SRA
Strongest Reducing Agent

- All $E°$ values are reduction potentials measured relative to the standard hydrogen electrode. $E°$ values are measured using standard half-cells with both the oxidizing and reducing agents present at SATP using 1.0 mol/L solutions.
- Values in this table are taken from *The CRC Handbook of Chemistry and Physics*, 71st Edition.