STANDARD REDUCTION POTENTIALS, E^o

The measure of a substance's relative oxidizing power is its **standard reduction potential, E^o**, defined by the following conventions:

1. The *standard reduction potential*, E^o, is defined for a half reaction of the type $Ox + ne^- \rightleftharpoons Red$

2. All E^o values assume 1 M concentrations and/or 1 atm partial pressure for all species at 25°C. These define *standard conditions*.

3. For the half reaction $2H^+(aq) + 2e^- \rightleftharpoons H_2(g)$ under standard conditions, we define $E^o \equiv 0$ volt (exactly). All other standard reduction potentials for other couples are determined relative to this arbitrary standard.

4. Oxidants that gain electrons better than $H^+(aq)$ [stronger oxidants than $H^+(aq)$] have $E^o > 0$ (i.e., +) for their reduction $Ox + ne^- \rightleftharpoons Red$.

5. Oxidants that gain electrons worse than $H^+(aq)$ [weaker oxidants than $H^+(aq)$] have $E^o < 0$ (i.e., –) for their reduction $Ox + ne^- \rightleftharpoons Red$.

6. The *standard oxidation potential* is the negative of the standard reduction potential and refers to the potential of the half reaction $Red \rightleftharpoons Ox + ne^-$. Thus,

   $Ox + ne^- \rightleftharpoons Red \quad E^o_{red} = E^o$ (standard reduction potential)

   $Red \rightleftharpoons Ox + ne^- \quad E^o_{ox} = -E^o$ (standard oxidation potential)

   ☞ We will always use E^o (without subscript) to refer to the reduction potential of a couple.