

REDOX CLASSIFICATION OF NATURAL WATERS

Oxic waters - waters that contain measurable dissolved oxygen.

Suboxic waters - waters that lack measurable oxygen or sulfide, but do contain significant dissolved iron ($> \sim 0.1 \text{ mg L}^{-1}$).

Anoxic waters - waters that contain both dissolved iron and sulfide.

DEFINITION OF Eh

Eh - the potential of a solution relative to the SHE.

Both pe and Eh measure essentially the same thing.

They may be converted via the relationship:

$$pe = \frac{\mathfrak{F}}{2.303RT} Eh$$

Where $\mathfrak{F} = 96.42 \text{ kJ volt}^{-1} \text{ eq}^{-1}$ (Faraday's constant).

At 25°C, this becomes

$$pe = 16.9 Eh$$

or

$$Eh = 0.059 pe$$

Eh – Measurement and meaning

- Eh is the driving force for a redox reaction
- No exposed live wires in natural systems (usually...) → where does Eh come from?
- From Nernst → redox couples exist at some Eh ($\text{Fe}^{2+}/\text{Fe}^{3+}=1$, $E_h = +0.77\text{V}$)
- When two redox species (like Fe^{2+} and O_2) come together, they should react towards equilibrium
- Total Eh of a solution is measure of that equilibrium