

Answer on Question #40682, Chemistry, Physical Chemistry

Question

THE OXIDATION POTENTIAL OF HYDROGEN ELECTRODE WILL BE GREATER THAN ZERO IF -

1. CONCENTRATION OF H⁺ IONS IS 2M
2. CONCENTRATION OF H⁺ IONS IS 1M
3. PARTIAL PRESSURE IS MORE THAN 2ATM
4. CAN NEVER BE POSITIVE

Answer

$$\phi_{2H^+/H_2} = \frac{RT}{2F} \ln \frac{[H^+]^2}{p(H_2)}$$

where [H⁺] is expressed in mol/l (or M) and p(H₂) is expressed in atm.

Logarithm function is positive if the argument is greater than unity. This can be achieved for different combinations of [H⁺] and p(H₂) values, and formally answers 1, 2 and 3 are all correct (and the answer 4 is incorrect, because it **can** be positive).

However, it can be supposed that the "standard conditions" are assumed: p(H₂) = 1 atm and [H⁺] = 1 M.

Then:

- the answer 1 is correct: $\ln(2^2/1) > 0$
- the answer 2 is incorrect: $\ln(1^2/1) = 0$
- the answer 3 is incorrect: $\ln(1^2/2) < 0$.

Answer: 1 (or **1, 2, 3** assuming the most generalized form of the question)