Max Plank's Quantum Theory

1. He proposed that the hot, glowing object could emit or absorb only certain quantities of energy:

$$E = nh\nu$$

where $E$ = energy of the radiation, J
$\nu$ = frequency (Hz)
$h$ = $6.626 \times 10^{-34}$ Js (Plank's constant)
$n$ = (1, 2, 3, ....) - quantum number

2. If an atom can emit only certain quantities of energy, it follows that the atom itself can have only certain quantities of energy. Thus, the energy of an atom is quantized, it exist only in certain fixed quantities, rather than being continuous.

3. Each change in the atom's energy results from the gain or lose of one or more "packets" definite amounts of energy.
Each energy packet is called a quantum ("fixed quantity" - plural, quanta) and its energy is equal to $h\nu$

4. Thus an atom changes its energy state by emitting (or absorbing) one or more quanta and the energy emitted/absorbed is equal to the difference in the atom's energy states.

$$\Delta E = \Delta n\, h\nu$$
(emitted or absorbed)

$\Delta n = 1$ (smallest change when an atom in a given energy state changes to an adjacent state)

Remember!  $\boxed{\Delta E}$ ← energy per particle (quantum)

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