Answer on Question #72194 - Chemistry - General Chemistry

Question:
Determine the empirical formula of an oxide of nitrogen containing 70% of oxygen if the relative molecular mass of the oxide is 92 deduce it's molecular formula

Solution:
Let's first calculate the stoichiometric ratio of elements in the oxide:

Element	Oxygen	Nitrogen
Mass percentage	70	30
Molar mass	15.999	14.067
Mass percentage/molar mass	4.375	2.133
Whole number	2.05	1

As we know, the molar mass of unknown oxide is: $M(N_xO_{2x}) = 92$ g/mol.

$$92 = (15.999 * 2.05 + 14.067 * 1) * x$$

$$x = 1.96 \cong 2$$

Answer: molecular formula of nitrogen oxide is N_2O_4.