

numAtomsInStoichiometric: StoichiometricT \times ElementT \rightarrow N
 numAtomsInStoichiometric (S, e) \equiv S.coeff * numAtomsInCompound (S.Compound, e)

numAtomsInChemEq: ChemicalEqT \times ElementT \rightarrow N
 numAtomsInChemEq (C, e) \equiv $\sum (s: \text{StoichiometricT} \mid s \in C \cdot$
 numAtomsIn ~~Compound~~ ^{Stoichiometric} (s, e))

elmInCompound: CompoundT \rightarrow set of ElementT
 elmInCompound (C) \equiv $\{ m: \text{MoleculeT} \mid m \in C \cdot m.\text{elm} \}$

elmInStoichiometric: StoichiometricT \rightarrow set of ElementT
 elmInStoichiometric (S) \equiv elmInCompound (S.Compound)

elmInChemEq: ChemicalEqT \rightarrow set of ElementT
 elmInChemEq (C) \equiv $\bigcup (s: \text{StoichiometricT} \mid s \in C \cdot \text{elmInStoichiometric} (s))$

isBalancedReactionForElm: ReactionT \times ElementT \rightarrow B
 isBalancedReactionForElm (R, e) \equiv
 numAtomsInChemEq (R[O], e) = numAtomsInChemEq (R[I], e)

isBalancedReaction (R): ReactionT \rightarrow B
~~isBalancedReaction~~ (elmInChemEq (R[O]) = elmInChemEq (R[I])
 $\wedge (\forall (e: \text{ElementT} \mid e \in \text{elmInChemEq} (R[O]) \cdot$
 isBalancedReactionForElm (R, e))