Balancing Chemical Equations

Balance the chemical reaction:

$$\_\_\_\ AgBr + \_\_\_\ GaPO_4 \rightarrow \_\_\_\ Ag_3PO_4 + \_\_\_\ GaBr_3$$

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Solution:

Step 1. Write out coefficients

a AgBr + b $GaPO_4$ → x Ag_3PO_4 + y $GaBr_3$

Step 2. Construct the atom equations:

Ag: a = 3x

Br: a = 3y

Ga: b = y

P: b = x

O: 4b = 4x

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Step 3. Set an initial condition:

Ag: a = 3x, a = 3, then x = 1 and y = 1 (Ag and Br Eqn.)

Br: a = 3y

Ga: b = y then b = 1

P: b = x

O: 4b = 4x

Therefore, the balanced equation is:

$$3\ AgBr + GaPO_4 \rightarrow Ag_3PO_4 + GaBr_3$$