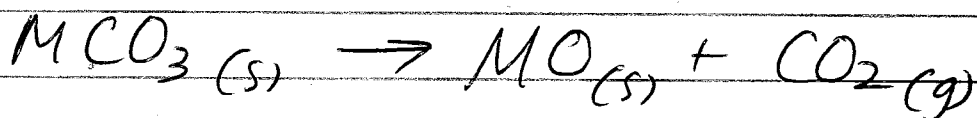


2.052 g of a metal carbonate, MCO_3 , is decomposed according to the reaction equation below:



If 0.4576 g of $CO_2(g)$ is produced, what metal is it?

Ba, Mg, Co, Cu, or Ca?

$$\frac{0.4576 \text{ g } CO_2}{44.01 \text{ g } CO_2} \times \frac{1 \text{ mol } CO_2}{1 \text{ mol } CO_2} \times \frac{1 \text{ mol } C}{1 \text{ mol } C} \times \frac{1 \text{ mol } CO_3^{2-}}{1 \text{ mol } C}$$

$$= \underline{0.01040 \text{ mol } CO_3^{2-}}$$

In the carbonate's formula MCO_3 , there is 1 mole of M to 1 mole of CO_3^{2-} , so we will have 0.0104 mole of M^{2+} as well.

$$\frac{0.01040 \text{ mol } CO_3^{2-}}{1 \text{ mol } CO_3^{2-}} \times 60.01 \text{ g } CO_3^{2-} = 0.6241 \text{ grams } CO_3^{2-}$$

The total mass of the metal carbonate is 2.052 g.

Subtract 0.6241 g of carbonate, and 1.428 g of M^{2+} are present.

$$\text{Molar Mass of } M = \frac{\text{g}}{\text{moles}} = \frac{1.428 \text{ g}}{0.0104 \text{ mole}} = 137.3 \text{ g/mole.}$$

The metal is Barium.