$CuSO_4 \cdot 5H_2O \xrightarrow[\text{heat}]{\Delta} CuSO_4 + 5H_2O$

Bright Blue (Hydrated) → Light green (Anhydrous) + steam (gas)

$Mass_{water} = Mass_{hydrate\ (Before)} - Mass_{anhydrous\ (After)}$

$(mol_{water}) \longrightarrow$ ratio $\longleftarrow (mol_{anhydrous})$

(ratio: #mol water)

A: large

Beaker Mass	Starting	heat → Final	Water
50.0g	56.2g	51.9g	56.2g − 51.9g = 4.3g
	56.2g − 50.0g = 6.2g	51.9g − 50.0g = 1.9g	
	hydrate	anhydrous salt	water

mol $MgCl_2$ (anhydrous)
MM = 95.21 g/mol
mass $MgCl_2$ = 1.9 g (final)

$$1.9\,\text{g} \times \frac{1\,\text{mol}}{95.21\,\text{g}} = 0.01995\,\text{mol}\ MgCl_2$$

mol water
MM = 18.02 g/mol
mass H_2O = 4.3 g (water)

$$4.3\,\text{g} \times \frac{1\,\text{mol}}{18.02\,\text{g}} = 0.2386\,\text{mol}\ H_2O$$

① 0.01995 mol $MgCl_2$ | ② 0.2386 mol H_2O

$$\text{mol}_{\text{ratio}} = \frac{\text{mol } H_2O}{\text{mol } MgCl_2} = \frac{0.2386\,\text{mol}}{0.01995\,\text{mol}}$$

$$= 11.95 \quad ③$$

$MgCl_2 \cdot 12\,H_2O$

1 mol $MgCl_2$: 12 mol H_2O