

Preparing standard solutions

1a Direct weighing method

REQUIREMENTS FOR PRIMARY STANDARD

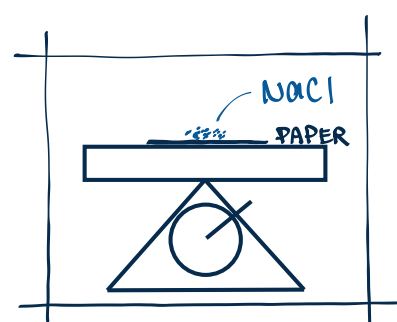
- Soluble in water
- X react w/ air
- X hygroscopic
- non-volatile
- non-toxic

cannot be performed for

$I_2 (cs)$	volatile \rightarrow sublimates
$KMnO_4 (cs)$	Strong OA, reactive
$NaOH (cs)$	neutralises by reacting w/ CO_2 hygroscopic

STEPS

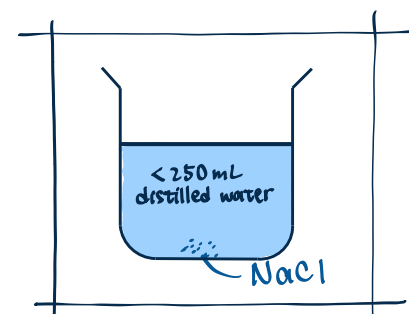
- Eg. prepare 0.1M NaCl solution



Weigh 1.465g of solid accurately w/ electronic balance

$$\begin{aligned} \text{molarity} \cdot \text{volume} &= \text{mole} & 0.1 \cdot 0.25 &= 0.025 \text{ mol} \\ \text{mole} \cdot M_r &= \text{mass} & 0.025 \times (23 + 35.5) &= 1.465 \text{ g} \end{aligned}$$

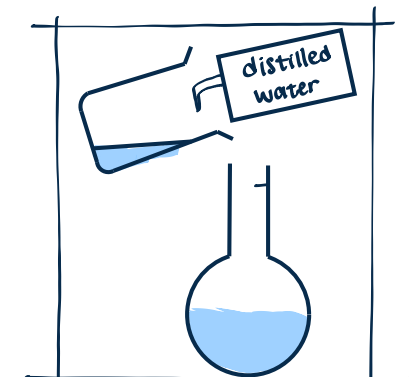
\rightarrow volumetric flask capacity
 $\rightarrow Na \rightarrow Cl$



Dissolve $NaCl (cs)$ in water completely.
(如果溶不到用 stirrer / 加热)

为啥不直接倒进 volumetric flask 里?

- flask 的开口太小, NaCl 会粘在开口上
- 倒进 flask 以后很难让不是 very soluble 的物质落在水里

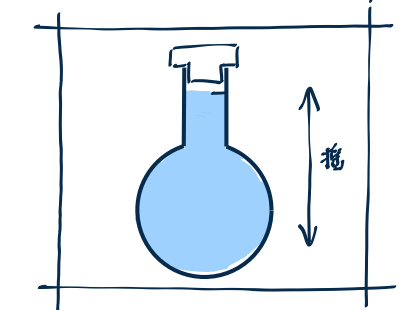


Pour solution in beaker to the volumetric flask.

Rinse the beaker w/ distilled water.

Transfer all the washings to the volumetric flask.

避免还有 NaCl 遗在了 beaker 里



Add distilled water to volumetric flask until it reaches 250 cm^3 graduation mark. Add a stopper then Shake well to dissolve.

1b Other method (系数).

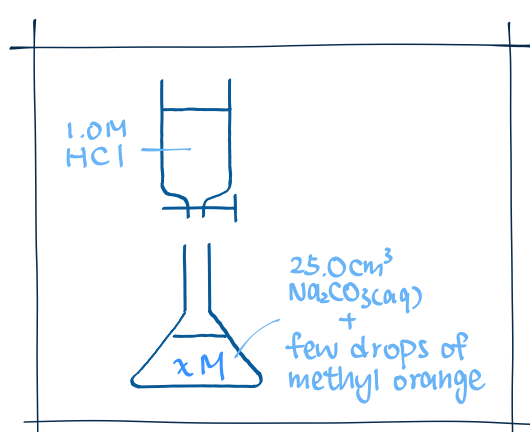
2 Double standardisation

OBJECTIVES & METHOD

- find actual concentration of std. solⁿ
- eg. After weighing, some Na_2CO_3 reacts w/ CO_2 .
 \hookrightarrow molarity of resultant solⁿ will be smaller than original.
- find by titrating against other std. solⁿ.

STEPS

- eg. prepared 1.0M Na_2CO_3 solution \rightarrow titrate against standard 1.0M HCl



used avg. of 48.6 cm^3 1.0M HCl to change colour (red \rightarrow orange)

$$\begin{aligned} \text{HCl} &: \text{Na}_2\text{CO}_3 = 2 : 1 \\ 1.0 \times 0.0495 &: x \times 0.025 = 2 : 1 \\ x &= 0.972 \end{aligned}$$