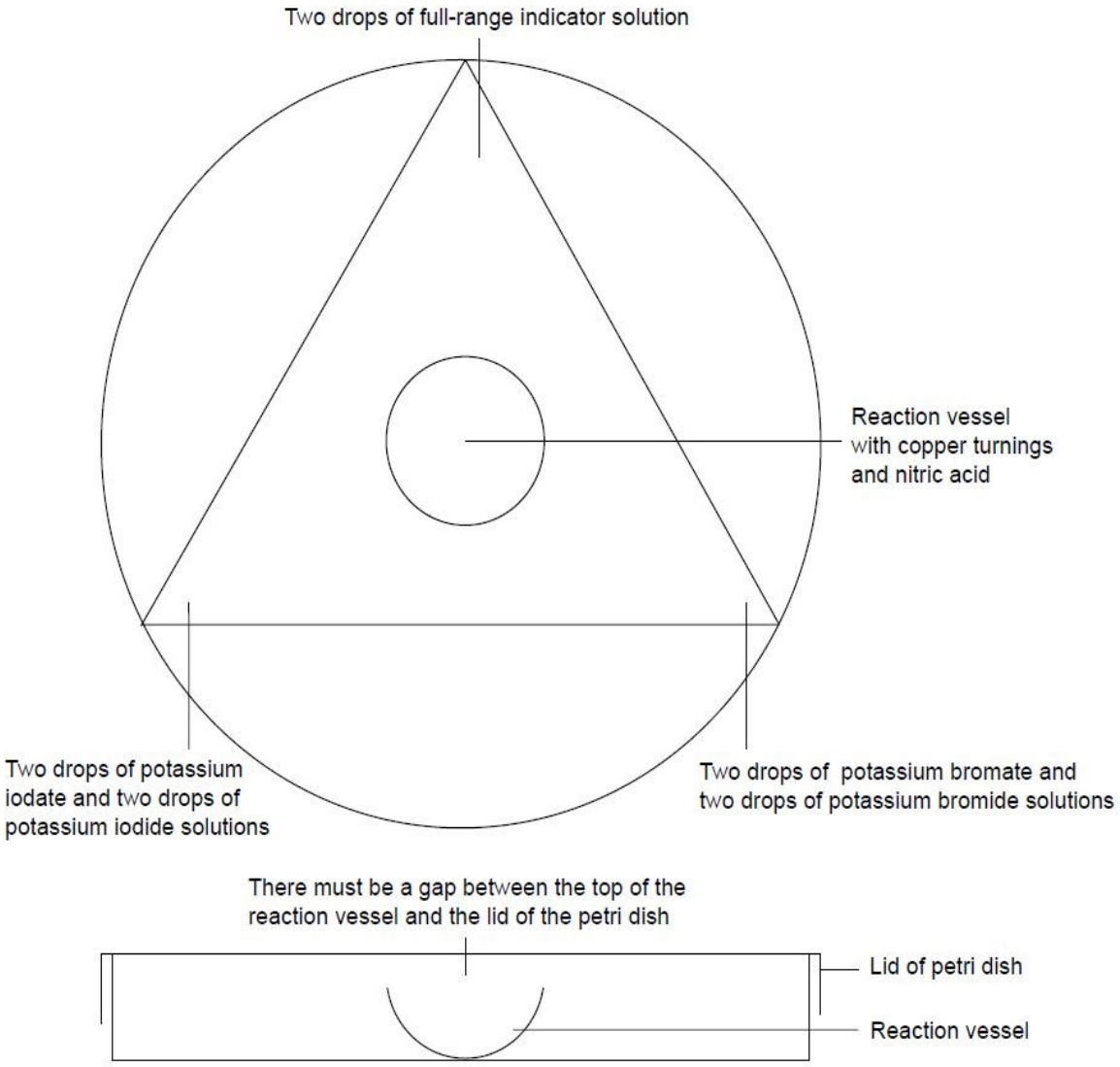
Some reactions of nitrogen dioxide – student sheet

Procedure

1. Cover the worksheet with a clear plastic sheet.
2. Place the base of the Petri dish directly over the circle below. Place the reaction vessel in the centre of the Petri dish.
3. Put two drops of full-range indicator where shown.
4. At another corner of the triangle, place two drops of ammonia solution. Place the lid on the Petri dish and wait for the indicator drop to change colour.
5. Remove the lid from the Petri dish and, using a piece of tissue, mop up the drop of ammonia.
6. At the two remaining corners of the triangle, add the two other test solutions.
7. Add a few copper metal turnings to the reaction vessel, followed by three drops of nitric acid. Quickly replace the lid on the Petri dish.
8. Record all your observations over the next 15 min.



Questions

1. What explanations can you give for your observations?

Health, safety and technical notes

- Read our standard health and safety guidance here https://rsc.li/3LVOUbN
- Students must wear suitable eye protection (Splash resistant goggles to BS EN166 3).
- Nitrogen dioxide is extremely toxic and corrosive if inhaled, with sometimes delayed effects. It is important to ensure that the amount of NO_2 generated does not result in significant leakage from the Petri dish (see CLEAPSS Hazcard HC068b). No more than 2 copper turnings should be used.
- Concentrated Nitric acid, $HNO_3(aq)$, 5 mol dm^{-3}, is CORROSIVE and gives of toxic fumes (see CLEAPSS Hazcard HC067).
- Potassium iodate(V), $KIO_3(aq)$,0.1 mol dm^{-3}, Potassium bromate(V), $KBrO_3(aq)$, 0.1 mol dm^{-3} (see CLEAPSS Hazcard HC080), Potassium bromide, KBr(aq), 0.2 mol dm^{-3} and Potassium iodide, KI(aq), 0.2 mol dm^{-3} are low hazard (see CLEAPSS Hazcard HC047b).
- Ammonia solution, $NH_3(aq)$, 3 mol dm^{-3} is corrosive and a respiratory IRRITANT (see CLEAPSS Hazcard HC006).