# SSERC logo

**SSERC Risk Assessment** (revised version March 2018)

(based on HSE’s INDG 163 ‘Risk assessment - A brief guide to controlling risks in the workplace’)

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| Activity assessed | Oxidation states of Vanadium |
| *Date of assessment* | 30th June 2020 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | | | |
| *by whom?* | | *Due date* | | *Done* |
| Ammonium vanadate is a skin/eye/respiratory irritant, a category 3 toxin by ingestion and category 1 by inhalation. It is also a suspected mutagen.  Ammonium vanadate solution is corrosive (from the acid) and toxic (Cat 3) by inhalation. It is also still a possible mutagen. | Technician when making up the solution by spillage or inhalation.  Technician handling solution.  Demonstrator by splashes / droplets | Wear rubber or plastic gloves and goggles (BS EN 166 3).  **Avoid raising dust.**  Avoid splashes where possible. Wear goggles (BS EN 166 3) |  |  | |  | |
| 1 mol l-1 Sulphuric acid is irritant to skin and eyes. | Technician preparing solution by splashing. | Avoid splashes where possible. Wear eye protection. |  |  | |  | |
| Potassium manganate VII is a oxidising agent and a category 4 toxin by ingestion. The 0.1M solution is of low hazard. | Technician preparing solution. | Keep away from combustible materials.  (potassium manganate VII stains skin. Wearing gloves will protect from this) |  |  | |  | |
| Zinc powder is flammable and reacts with water/acid to release flammable gases. | Technician weighing out.  Demonstrator carrying out reaction | Keep the zinc powder away from sources of ignition and acids and keep it dry. |  |  | |  | |
| Sulphur dioxide is corrosive and a category 3 toxin by inhalation.  SO2 solution will release SO2 gas. | Technician preparing SO2 solution  Demonstrator carrying out demonstration | Carry out in a fume cupboard.  Wear goggles (EN 166 3) and gloves.  Amount used is small. Carry out in a well ventilated area and replace lid on SO2 solution after use. |  |  | |  | |

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| **Description of activity:**  Ammonium vanadate V solution (in H2SO4) is reduced by SO2 to V 4+ and then by zinc powder to 3+ and 2+.  The V 2+ solution is then re-oxidised through the states to 5+ by potassium manganate VII |
| **Additional comments:**  Zinc and vanadium are hazardous to the aquatic environment so the reaction mixture should not be poured down the drain.  See entries under **vanadium compounds** and **zinc** on the SSERC website for details of disposal |