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**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 | A Spectacular reversible reaction |
| *Date of assessment* | 24th March 2019 |
| *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* |
| Copper sulphate is harmful by ingestion and causes serious eye damage.Copper sulphate solution is of no significant hazard | Demonstrator or technician preparing solution. | Wear goggles (EN 166 3) Avoid raising dust. |  |  |  |
| Hydrochloric acid is corrosive and gives off corrosive fumes. | Demonstrator or technician preparing solution.Demonstrator carrying out reaction. | Decant hydrochloric acid in a fume cupboard.During demonstration have the minimum amount needed on the bench. Keep container stoppered wherever possible. |  |  |  |
| Ammonia (.880) is corrosive and gives off corrosive and toxic (Cat 3) fumes. | Demonstrator or technician preparing solution.Demonstrator carrying out reaction. | Decant ammonia in a fume cupboard.During demonstration have the minimum amount needed on the bench. Keep container stoppered wherever possible. |  |  |  |
| Ammonium chloride is an eye irritant and is harmful by ingestion | Demonstrator or audience by inhaling ‘smoke’ | Work in a well ventilated room. Have a fume cupboard handy to place the flask in if too much ammonium chloride is produced. |  |  |  |

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| **Description of activity:**Concentrated hydrochloric acid is added to dilute copper sulphate. The solution goes green due to a copper-chlorine complex. Ammonia is then added and the solution goes blue dues to a copper-ammonium complex. Clouds of ammonium chloride smoke can also be given off.Further additions can keep reversing this reaction. |

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| **Additional comments:**Neutralise the final solution and then, as the copper is very dilute, it can be washed to waste with plenty of cold running water. |