

COSHH RISK ASSESSMENT

Department / area Chemistry; Kathleen Lonsdale Building	Date 08/08/2011	Assessment No.	Total no. of pages 4
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DESCRIPTION OF THE ACTIVITY (including all job steps)

Coating substances onto metal surfaces and onto glass using an artist spray brush. Firstly, all the solution samples of specific concentration of nanoparticles in solvent (water) were prepared and stored overnight in their respective sample bottles or in beakers sealed with nesco film. Conductive glass as well as normal glass were cut into desired sizes for use. Stainless steel square sheets were also prepared. Gloves, goggles, a lab coat and a face mask were worn at all times during this experiment.

Secondly, the fume hood was prepared by placing down paper towels and old newspapers throughout to contain any spillages or mess caused. The artist brush equipment was set up with ease and the sample vial was filled with the sample solution and connected to the spray brush. The spray brush was then connected to an air supply. A hot plate was left to heat up to the desired temperature at which the sample solution that is sprayed onto the surface coated efficiently enough. The fume hood was switched off while the spraying of the sample solution onto the material's surface occurred.

Once finished, the fume hood was switched on. The coated glass and metal squares were left to cool and dry to some extent. They were then placed into the oven to sinter at around 400°C for half an hour. Whilst that was taking place, the hot plate was cleaned with care as it was still hot. The spray brush itself was cleaned by spraying out the sample until only air was sprayed. Deionised water was then sprayed followed by the spraying of a specialised cleaning solution to fully clean the spray for use with the next sample solution. The next sample solution was prepared and the procedure above was repeated.

The coated glass plate was sintered in an oven for 15-20 minutes at 450°C, and left to cool down afterwards for an hour. A sensitizing dye solution is prepared to dip the coated glass plate into, where either an artificial dye solid or a natural dye from the crushing of frozen berries is used.

The artificial dye is dissolved into a solution of methanol in a beaker and stirred for an hour. Glass plate is placed into the dye solution and left for 4-8 hours in the absence of sunlight and air.

Another glass plate was coated with platinum particles. Iodine solution was used as an electrolyte, which was placed in between the two glass plates (anode and cathode) in order to complete the circuit. Bulldog clips were used to hold the cell in place and to produce an open-vessel solar cell. Superglue was also used as glue as well as a spacer in order to create a closed-vessel solar cell.

SUMMARY OF ADDITIONAL ACTIONS

Action to be taken	By whom	Target date	Date completed
N/A.			

Name and signature of assessor:	Date:
Name and signature of Head of Department: N/A.	Date: N/A.
For students: name and signature of supervisor:	Date:

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REVIEW OF ASSESSMENT

Date:	Name(s) and signature(s) of reviewer(s)	Outcome of review (eg no change, minor changes, new assessment work stopped)
N/A	N/A	N/A

SUBSTANCES INVOLVED (with approximate quantities)	HAZARDS (eg from CHIP)	MEL/OES (from EH40)	ROUTES OF ENTRY
Methanol	N/A	N/A	N/A
Ruthenizer 535-bisTBA	May cause allergy or asthma symptoms or breathing difficulties if inhaled		Inhalation, digestion
Iodine solution	None	N/A	N/A
Titania (P25)	None	N/A	N/A

Are any: asthmagens? Yes No ; carcinogens? Yes No ; biological agents? Yes No

If yes, attach a description of how the COSHH additional requirements are being met.

OTHER HAZARDS

Ionising radiation / laser / UV: Yes ; No ; **If yes, specify:**

Other hazards (describe):

Hot plate will be operated at very high temperatures, as high as 250°C. The sintering process will also occur at roughly 400°C in an oven. Pressurised air will also be used at a pressure of 30psi.

Precautions: Great care needs to be taken in both instances to avoid contact with your skin. Use oven gloves when possible. Let the hot plate cool down or carefully remove as much of the waste placed onto the hot plate as possible without physically touching the hot plate. Make sure the air supply to the air brush is operating correctly.

PERSONS AT RISK (Who might be harmed and how?)

Person setting up and carrying out experiment (myself). Anyone in the near vicinity will not be in danger so long as they do not touch any of the equipment.

Are new / expectant mothers especially at risk?

Yes
No

EXISTING PRECAUTIONS (What controls are currently in place and are they adequate?)

Engineering measures (indicate if used)

Complete enclosure ; biological safety cabinet (specify containment level)

Fumecupboard ; other LEV ; general ventilation ; other (describe) ; Fume hood.

Procedural measures (indicate if used)

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Written instructions / procedures ; Training ;

Health surveillance ; air monitoring ; Fit-testing for RPE

Personal protective equipment (indicate if used)

Gloves, goggles and lab coat are worn at all times. Mask is worn when handling solid nanoparticles.

Face & eyes: visor ; goggles ; spectacles Hands: ; Respiratory (RPE) ;

Other: (specify): Lab coat

Specify grade, type etc:

EMERGENCY PROCEDURES (if any substance and/or procedure identified overleaf are likely to pose a special hazard in an emergency, then describe any special information for those dealing with it.)

Special hazard: N/A

FIRST AID & OTHER

N/A

SPILLAGE (indicate if used)

Method: Neutralise/dilute ; Mop-up ; Disinfectant ; Spillage kit ;

Other (describe)

Personal Protective Equipment: hands ; face ; body ; none

DISPOSAL OF WASTE (indicate if used)

Autoclave: ; Yellow bag: ; Chemical waste: ; Drain: ; No hazard:

Notes: Blue roll tissue paper is laid on and around the area to which spray coating will be carried out. Hot plate will be cleaned with D.I. water in order to remove any nanoparticles sprayed onto it when the hot plate is at room temperature.

ASSESSMENT (Are the existing precautions adequate? If not, why not? Attach additional sheets if necessary)

Yes.