

APPENDIX 1: NanoRiskCat●●●|●● Template

Literature methodology/sources of information

The following sources of information were used to fill out the NanoRiskCat●●●|●● for nanoPlatinum:

1. Relevant literature was identified through ICON The Virtual Journal of Nanotechnology Environment, Health and Safety <http://www.icon.rice.edu/advancedsearch.cfm> searching for articles that use "Platinum" in Keyword(s) or Word(s) in the Abstract.
2. Stone V, Hankin S, Aitken R, Aschberger K, Baun A, Christensen F, Fernandes T, Hansen SF, Hartmann NB, Hutchinson G, Johnston H, Micheletti G, Peters S, Ross B, Sokull-Kluettgen B, Stark D, Tran L. 2009. Engineered Nanoparticles: Review of Health and Environmental Safety (ENRHES). Available at: <http://ihcp.jrc.ec.europa.eu/whats-new/enhres-final-report> (Accessed July 15, 2010)
3. Griffitt, R.J., Luo, J., Gao, J., Bonzongo, J.C. & Barber, D.S. 2008, "Effects of particle composition and species on toxicity of metallic nanomaterials in aquatic organisms", *Environmental Toxicology and Chemistry*, vol. 27, no. 9, pp. 1972-1978.

Human hazard profile

1. **HARN: Does the nanomaterial fulfill the HARN paradigm?**

Answer: No

Arguments and explanation: To the best of our knowledge nanoPI particles do not fulfill HARN

2. **Bulk – "Level A CLP": Is the bulk form of the nanomaterial known to cause or may cause serious damaging effects?**

Answer: No

Arguments and explanation: Platinum is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No

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1907/2006

3. **Bulk – “Level B CLP”:** Is the bulk form of the nanomaterial classified for other less adverse effects according to the CLP?

Answer: No

Arguments and explanation: Platinum is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

4. **Nano – Acute toxicity:** Is the specific nanomaterial known to be acute toxic?

Answer: No data

Arguments and explanation: No information available

5. **Are there indications that the nanomaterial causes genotoxic-, mutagenic-, carcinogenic-, respiratory-, cardiovascular, neurotoxic or reproductive effects in humans and/or laboratory animals or has organ-specific accumulation been documented?**

Answer: No data


Arguments and explanation:

- a. Genotoxicity and mutagenicity: No information available
- b. Respiratory tract toxicity: No information available
- c. Cardiovascular toxicity: No information available
- d. Neurotoxicity: No information available
- e. Reproductive damage: No information available
- f. Carcinogenicity: No information available
- g. Does the nanomaterial accumulate in tissue and/or organs?:

No information available

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6. Overall evaluation of human hazard

We conclude that the color-code that best reflects the human hazard profile of the nanomaterial used is  as no information is available on human health hazards of nanoPI

Environment hazard profile

1. Bulk – “Level A CLP”: Is the bulk form of the nanomaterial classified as CLP Acute 1 or Chronic 1 or Chronic 2?

Answer: No

Arguments and explanation: Platinum is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

2. Nano – $LC_{50} < 10 \text{ mg/l}$: Is the nanomaterial in question reported to be hazardous to environmental species i.e. LC_{50} or $EC_{50} < 10 \text{ mg/l}$?

Answer: No

Arguments and explanation: To the best of our knowledge nanoPI has not been reported to be hazardous to environmental species i.e. LC_{50} or $EC_{50} < 10 \text{ mg/l}$?

3. Bulk – “Level B CLP”: Is the bulk form of the nanomaterial classified as CLP Chronic 3 or Chronic 4 or documented nano-specific effects?

Answer: No

Arguments and explanation: Platinum is not classified in the Annex VI of Regulation (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December

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2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

4. **Nano – LC50<100 mg/l: Is the nanomaterial in question reported to be hazardous to environmental species i.e. LC50 or EC 50 <100 mg/l?**

Answer: Yes

Arguments and explanation: Asharani et al. (2011) have observed that Platinum particles caused a concentration dependant increase in mortality rate to $10 \pm 7.1\%$ at $100 \mu\text{g/ml}$ while a concentration of 100 mg/ml resulted in $50 \pm 9.9\%$ drops in hatching rates in treated embryos.

5. **$T_{1/2}>40$ days: Is the nanomaterial in question persistent i.e. $T_{1/2}>40$ days?**

Answer: Maybe

Arguments and explanation: According to Stone et al. (2010): “By definition metal nanoparticles are not degradable. However, changes in the metal speciation can occur depending on redox conditions, salt content etc. These changes in speciation are as complex as they are for conventional metal forms and no general conclusion can be made in this regard.”

6. **Overall evaluation of environmental hazard**

Given the fact that nanoPI have been reported to be hazardous to environmental species i.e. LC50 or EC 50 <100 mg/l and $T_{1/2}>40$ days, we conclude that the color-code that best reflects the environmental hazard profile of nanoPI is ●