

Questionnaire Exemption Request No. 13

Exemption for “Lead in platinized platinum electrodes for wide range conductivity measurements, or conductivity measurements in strong acidic or alkaline environment”

Background

The Öko-Institut together with Fraunhofer IZM has been appointed within a framework contract for the evaluation of applications for granting, renewing or revoking an exemption to be included in or deleted from Annexes III and IV of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.¹

The Japan Business Council in Europe (JBCE) has applied for an exemption of
“Lead in platinized platinum electrodes for measurement instruments”

The applicant puts forward the following main arguments.

Platinized platinum electrode is a platinum electrode covered with a thin layer of platinum black. These electrodes are used when wide-range conductivity measurements are required or when measuring conductivity under strongly acidic or alkaline conditions.

Platinum is used for these electrodes because it prevents chemical reaction in the solution, functions as a catalyst and efficiently stimulates the oxidation-reduction reaction of hydrogen.

The performance of electrodes as a catalyst and their electric capacitance is proportional to their surface area. Therefore, platinum black electrodeposition is performed to enlarge the surface area of metal electrodes. This process enlarges the surface area of the electrodes by about 1,000 times the surface area of flat electrodes without platinum black.

Lead is used as an additive in the electrodeposition process of platinum black onto the electrode, and a small amount remains in the layer of platinum black. Using lead acetate as an additive has been shown to produce very good platinum black deposits.

The applicant states that the use of lead acetate cannot be sufficiently substituted in the production of platinized platinum electrodes, used for measuring conductivity under strong acidity or alkalinity or when a broad range measurement is required.

For details, please check the applicant’s exemption request at <http://rohs.exemptions.oeko.info/index.php?id=156>. This exemption request has been subject

¹ Contract is implemented through Framework Contract No. ENV.C.2/FRA/2011/0020 led by Eunomia

to a first completeness and plausibility check. The applicant has been requested to answer additional questions and to provide additional information (c.f. link above).

The objective of this consultation and the review process is to collect and to evaluate information and evidence according to the criteria listed in Art. 5 (1) (a) of Directive 2011/65/EU (RoHS II), which you can be found under:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011L0065:EN:NOT>.

If you would like to contribute to the stakeholder consultation, please answer the following questions:

Questions

1. The wording suggested by the applicant for this exemption would be **“Lead in platinized platinum electrodes for wide range conductivity measurements, or conductivity measurements in strong acidic or alkaline environment”**
 - a. Do you agree with the scope of the exemption as proposed by the applicant? Please suggest an alternative wording and explain your proposal, if you do not agree with the proposed exemption wording.
 - b. Please state whether you either support the applicant’s request or whether you would like to provide argumentation against the applicant’s request. In both cases provide detailed technical argumentation / evidence in line with the criteria in Art. 5 (1) (a) to support your statement.
2. The applicant could not provide any quantities regarding the total amount of lead used for this application.
 - a. Please verify the quantity of lead used per item, in % weight units.
 - b. Please quantify for the EU, if possible, how many items are used per annum.
Estimation is fine in case you do not have exact data, however please explain calculation and assumptions.
3. Feltham and Spiro (1970) explain that platinized platinum electrodes are used mainly as hydrogen reference electrodes, as inert surfaces of high area in conductance work and as catalysts and electrocatalysts. They elaborate on the platinization method and solutions recommended for producing the electrodes for these applications. In this context, it is stated that for systems sensitive to trace impurities, platinization without lead additive is has been recommended.
 - a. Please elaborate what applications of platinized platinum electrodes require that the electrode be produced with lead additive.

- b. Please specify in which cases lead free substitutes may be used.
4. Feltham and Spiro (1970)² mention the following substances and their applicability as substitute additives for lead in this application:
- Copper – found to be acceptable as a substitute
 - Mercury– found to be acceptable as a substitute - however also a RoHS regulated substance
 - Gold and thallium – give deposits of good quality
 - Cadmium, Zinc, Nickel and Iron – give gray inferior deposits
- They explain that though alternative additives have been studied, none has been employed as extensively as lead acetate.
- a. Please provide information concerning possible substitutes of lead in this application or concerning developments that may allow for reducing the amount of lead necessary or for the complete elimination of the use of lead in this application.
- b. If information concerns possible future substitution, please provide an outline of the timeframe required for completing reliability testing, registering new products, redesign needs etc., so that substitute becomes available.
5. If the use of a substitute is possible, such as replacing the lead additives with copper or other substances mentioned in question 4, or through implementing other technological developments, please indicate if the negative environmental, health and/or consumer safety impacts caused by substitution are likely to outweigh the environmental, health and/or consumer safety benefits. If existing, please refer to relevant studies on negative impacts caused by substitution.

Finally, please do not forget to provide **your contact details** (Name, Organisation, e-mail and phone number) so that Öko-Institut/Fraunhofer IZM can contact you in case there are questions concerning your contribution.

² Feltham, A. M., and Spiro, M., 1971, *Platinized Platinum Electrodes*, Published in Chemical Reviews, Vo. 71, No. 2, Pg. 177-193