Review of “Application of the Electrochemistry Noise Technology to the Evaluation of the Corrosion Inhibitor” by Jun Cui, Yuansheng Pei

While this paper on the application of EN techniques to the study of inhibitor performance is potentially useful, the paper suffers from a number of weaknesses:

- The English is poor, such that it is often unclear and in at least one case says the opposite of what I believe is intended.
- The description of experimental and data analysis procedures is inadequate.
- There are questions about the quality of the measured data and the accuracy of some of the data presented.

It may be possible to produce a revised paper that is suitable for publication, but only if it can be demonstrated that the measured data are valid.

L44 “However, the weight loss experiment consumes a large amount of materials owing to the non-reusable of the metal substrate;” unless the material is extraordinarily expensive this is a very minor problem compared to the other costs involved.

L50 “in-suit” presumably “in-situ” is intended.

L65 “However, rare studs apply EN technology to evaluate the passivation behavior of the corrosion inhibitor.” - while there may be relatively few studies using EN on inhibited systems, there have been some, and these should be mentioned.

L74 “a controlled-release inhibitor” this is an inadequate description of the inhibitor chemistry.

L100 “44% of epoxy value” what does this mean?

L102 “polisher powder” inadequate description.

L109 I believe the Autolab potentiostat does not have anti-aliasing filters that can be adjusted to be appropriate for the sampling frequency in use, so there is a significant risk that the measured data are contaminated by aliasing. The validity of the measured EN needs to be confirmed (e.g. by following the procedure in “Guideline for an assessment of electrochemical noise measurement devices”, S. Ritter, F. Huet and R.A. Cottis, *Materials and Corrosion-Werkstoffe Und Korrosion*, Volume: 63, Issue: 4, Pages: 297-302, 2012).

L116 “five-order fitting method” presumably this really means subtraction of a fifth order polynomial, but the significance of this remains unclear, since there is no mention of the time record duration to which this trend removal was applied.

L126 More information needed on EIS parameters, particularly number of frequencies per decade and overall measurement time.

L146 “an acceptable passivation performance was obtained until the total boron concentration over 100 mg L-1” should this actually say “… was <u>not</u> obtained ...”?

L147 It appears that the objective of the test procedure on the controlled release inhibitor was to test in reasonably constant inhibitor concentration, in which case why was a controlled release inhibitor used?

L285 30 days is hardly ‘long-term’ in a real application.

L395 “shot noise”.

Figure 3 The normalization of the current and potential signals with respect to area makes no sense at all. For absolute values of current and potential it is reasonable to report current per unit area and potential independent of area, but for EN the effect of area is less clear, so it is best just to report coupling current and potential (see “The Interpretation of Electrochemical Noise Data”, R.A.Cottis, *Corrosion*, 27, 3, 265-285 (2001)). It is also unclear what is actually being plotted – are they the ‘raw’ potential and current (this seems unlikely as the signals display little short-term variation) or the results after trend removal or some other statistical treatment such as standard deviation?

Figures 4, 9, 13 Why is 1/Rn plotted in 4 and Rn or Rp in 9 and 13 – this is just confusing? Also the 1/Rn values in 4 seem completely incompatible with the Rn values in 9 and the Rp values in 13