ICRN 20

IAPWS Certified Research Need – ICRN

Sensors for use at Elevated Temperature in the Plant Cycle of the Power Industry

Closing Statement

In formulating ICRN 20 originally in 2006 and revising it in 2011, the IAPWS Working Group *Power Cycle Chemistry* had examined the published work in the area of water chemistry sensors applied under elevated temperature. As result of surveying the techniques for determining water chemistry at power plants, it was confirmed that high-temperature water chemistry sensors are a key technology determining the conditions of water chemistry in nuclear power plants (NPPs) [1].

IAPWS recognized that there was a requirement for work to be pursued in this field and so prepared the ICRN to assist potential investigators in obtaining sponsorship. Specifically, requirements for development of new sensors and improvement of them for application in operating plants were identified as subjects to be researched.

To date (2014), several reports of the development and application of high-temperature sensors have been generated. Electrochemical corrosion potential (ECP) sensors for application under irradiation have been developed in the JMTR in-pile loop at the Japan Atomic Energy Agency; they will eventually be applied in operating NPPs [2]. High-temperature sensors for flow-accelerated corrosion (FAC) based on electrical-resistance measurement have been developed for application in laboratory facilities and thermal-plant trials [3] and those based on on-line hydrogen detection have been applied in NPPs and fossil-fuel power plants (FPPs) [4].

It is confirmed that high-temperature water chemistry sensors are important tools for NPPs, but their application in FPPs is not so urgent. The ICRN 20 is closed here; development of new sensors and improvement of them for application in NPPs will continue to be followed up by the Nuclear Committee of the IAPWS Working Group *Power Cycle Chemistry.*

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References

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