

Evaluation of high temperature characteristics on optical fiber sensor for developmet of a sodium leak detector

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The purpose of this study is to review the applicability of optical fiber sensor as to a new type of sodium leak detector from the information on coating material having high temperature durability. In this experiment, the temperature characteristics of acrylate coated multimode fiber and polyimide coated multimode fiber were analyzed under 25~600°C using Distributed Temperature Sensor(DTS) to understand the signal change of optical fiber sensor in the temperature change. The results showed that the acrylate-coated multimode optical fiber began to discolor at about 150 °C and vaporized at 400 °C which could not be measured temperature due to a sudden light loss with vaporization. However, after vaporization of all the coatings, the optical loss had been restored to its original state and temperature sensing was possible state. In case of polyimide, the color changed at 400°C and vaporized at 550°C. The abnormality did not observed in the optical loss and temperature measurement during the test up to 600 °C . The error due to the signals generated in the DTS electronics can be improved by applying lead-lag compensation.