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DEVELOPMENT OF LASER PUNCTURING AND FISSION GAS ANALYSIS SYSTEM FOR FUEL ROD IN HOTCELL

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To measure a very small fission gas amount in fuel rod, laser puncturing was available to make hole on the surface of a cladding tube instead of steel needle puncturing due to reduction of chamber volume. After puncturing, pressure difference was measured by a fine pressure gauge. A small chamber and a quartz tube were used to measure small gas amount and to penetrate laser shot from outside. The pressure and the vacuum ranges are 1˜1,000 torr and ˜10-6 torr, respectively. This system can be measured at least 2cc at room temperature. After measuring gas pressure, fission gases were transferred to QMS(Quadruple Mass Spectrometer) in high vacuum state which is installed in glove box to analyze gas contents(up to 200 amu). QMS was useful to measure xenon, krypton and helium. It must be calibrated with several reference gases(He+Xe+Kr). Measurement of total amounts and quantitative contents of fission gases in fuel rod was carried out at one time. U-Zr metallic fuel rods were used to measure total gas amounts and to analyze contents of helium, xenon and krypton.

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