High Energy Resolution Tender X-ray Spectrometer at SSRL

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A high-resolution x-ray spectrometer for the tender x-ray regime (1.6 – 6.0 keV) has been designed, built and commissioned at SSRL beamline 6-2. The spectrometer is developed on a Rowland geometry (500 mm of radius) using cylindrically bent Johansson analyzers (70 mm × 15 mm) and a position sensitive detector (CCD camera, 2048 × 2048 pixels of 13 μm^2). By placing the sample inside the Rowland circle, the spectrometer can operate in a wide range of diffraction angles (~30 – 65 deg) achieving subnatural line-width energy resolution (~0.5 eV @ 2400 eV) when x-ray emission spectra are detected/recorded in a dispersive mode. The whole spectrometer is enclosed in a vacuum chamber. An independent sample chamber, separated with a Kapton window from the main chamber, has been incorporated to permit flexibility of the sample environment (e.g. in-situ cells, radioactive materials, etc.). First applications and in-situ catalysis experiments will be presented and discussed.