Development of a "barrel" von Hamos XES spectrometer and its application to catalytically-relevant platinum compounds

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X-ray emission spectroscopy has developed into a powerful technique for investigating the geometric and electronic structures of inorganic species, finding applications in fields as diverse as heterogeneous catalysis and bioinorganic chemistry. Increasingly, it is of interest to apply x-ray emission methods to time-resolved studies so that chemical reactions under *operando* conditions can be investigated using the rich information content of these spectra. Dispersive von Hamos type spectrometers based on cylindrically-bent crystal analyzers allow for the simultaneous collection of an entire XES spectra at once, enabling such time resolution. Unfortunately, these spectrometers typically intercept only a small solid angle per energy, limiting their applications to samples with low concentrations of emitting element. To overcome this limitation, herein we present the development of a “barrel” type von Hamos spectrometer, which employs cylindrically-bent Si analyzers arranged in a 360° ring. The small 125 mm radius and 360° of collection allow this spectrometer to intercept a large solid angle, and detection is possible using either 1D (e.g. Mythen) or 2D (e.g. Pilatus) detectors. This work demonstrates the functionality of this spectrometer and details its application to studying the $L\beta_{2,15}$ and $L\gamma$ emission lines of platinum complexes.