

On the prospects for high - throughput XAS studies using third – generation synchrotron sources

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Third generation synchrotron sources are able to deliver up to 10^{13} photons/second in a micron-scale spot. This is a sufficiently high flux that, with an optimized detector, it should be possible to measure spectra much more rapidly than has been typical in the past. For modest concentration (i.e, ppm) biological samples it is possible, at least in principle, to measure high-quality XANES spectra in a matter of seconds and EXAFS spectra in a matter of minutes. Although the perfect x-ray fluorescence detector does not exist, it is possible to approach this ideal situation. We will discuss recent work towards this objective using the facilities at BioCAT (APS). With the extremely high flux-density that is provided by third-generation sources, radiation damage becomes a much more serious problem. We will discuss efforts to solve this problem using rapid-flow systems. Finally, we will discuss the prospects for using XAS in a high through-put mode for genome-wide studies.