

UV-Vis Spectrophotometric Investigations into Amino Acids in Aqueous Solution at High Temperatures and Pressures

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Our current focus is to determine experimentally the stabilities of amino acids at temperatures and pressures up to 300°C and 100 bar. Previous studies carried out in this field are contradictory and in some cases inconclusive. The aim of this work is to measure the aqueous reaction kinetics for the degradation of selected amino acids with respect to the activities of the possible disproportionation products.

The experimental approach to this problem is twofold: the solutions are first observed spectro-photometrically (uv-vis) and *in situ* at the chosen temperatures and pressures, and are secondly analysed by ion chromatography by sampling on-line directly after the cell. To this end, a special spectrophotometric cell is used which presents several advantages: the cell is completely lined with a thin layer of inert gold, such that our solutions are isolated from any reactions or degradation which

could result from contact with potentially reactive transition metals and their corrosion products; the cell has quartz windows which allow for the passage of wavelengths further in the ultraviolet range (down to 190nm) than other less uv-transparent materials like synthetic sapphire; and it can be used in either flow-through or stopped-flow mode. The entire flowpath of the system from pump to exit was built to be entirely inert. Additionally, the system is designed to permit the taking of a flow-through sample of solution without affecting the system or requiring parts of it to be closed off. The samples can then be injected onto our ion chromatograph, providing a confirmatory method to the investigation and quantification by spectroscopy.

Preliminary stability data for selected amino acids at temperatures and pressures up to 300°C and 100 bar will be presented.