

Gatehouse B M, Livingstone S E & Nyholm R S. Infrared spectra of some nitrate-co-ordination complexes. *J. Chem. Soc.* 1957: 4222-5.  
[William Ramsay and Ralph Forster Labs., University College, London, England]

The infrared absorption spectra of a number of nitrate-complexes of metals were examined in the region between 4,000 and 700  $\text{cm}^{-1}$ . Assignments were made for vibrations characteristic of the coordinated nitrate-group. Strong absorption bands that do not occur in ionic nitrates were identified in the regions 1,530-1,480 and 1,290-1,250  $\text{cm}^{-1}$ . [The SCJ<sup>®</sup> indicates that this paper has been cited over 290 times since 1961.]

B.M. Gatehouse  
Department of Chemistry  
Monash University  
Clayton, Victoria 3168  
Australia

April 27, 1982

"The arrangement of a United Kingdom Atomic Energy Authority (UKAEA) grant by R.S. Nyholm following his appointment to University College London as the foundation professor of inorganic chemistry enabled me to rejoin him from the (then) New South Wales University of Technology. My infrared spectroscopy studies commenced at the latter institution, where as the holder of the Australian Leather Research Association scholarship I spent a period of time examining kangaroo tail tendon collagen and its propensity (or otherwise) for binding chromium ions! Perhaps more fundamental were the amino acid and peptide complexes of transition elements whose spectra were studied for characteristic changes on coordination.

"At William Ramsay and Ralph Forster Laboratories, University College London, my task was to set up facilities for the routine running of infrared spectra and, as my PhD project, to devise diagnostic tests for the presence of simple ligands in complexes, to detect whether or not they were coordinated to the central metal ion, and to obtain some idea of the nature of the bonding

involved. Thus, this work was prompted by the desire to provide research chemists with a rapid means of determining as much structural information as possible, using infrared spectra, on their complexes.

"The 12-month delay in the arrival of the Grubb-Parsons spectrometer meant many visits to use facilities at establishments such as that of Imperial Chemical Industries at Welwyn Garden City—memorable for the Bristol Cream at lunchtime—and that of the UKAEA at Harwell—where I recall the fascination with which I observed that CsBr plates bend when dropped!

"The arrival of coauthor Stanley Livingstone on study leave from New South Wales University of Technology meant that preparation of compounds was speeded up considerably and other joint projects commenced.

"The reasons why this, my second research paper, has been cited frequently probably include the simplicity of the diagnostic test determined for identification of coordinated nitrate-ligands, and the fact that it was the first report of a means by which the exchange of coordinated ligands with  $\text{Cl}^-$  in NaCl plates might be avoided. It was observed that the nitrate spectra were those of a  $\text{C}_{2v}$  group when new plates (coated with polystyrene) were used, but those of a  $\text{D}_{3h}$  ion when the plates had been used and washed a few times. Communications with Grubb-Parsons elicited the nature of the coating and a subsequent brief note<sup>1</sup> described it in the literature. One wondered at the time what effect a pressed KBr pellet would have on some of the compounds!

"I was awarded the Ramsay Memorial Medal and Prize for 1957-1958. On completion of my PhD thesis I left the field of infrared spectra of complexes to work for three years in atomic absorption spectroscopy and to then take up molecular structure determination by X-ray diffraction methods—thus self-citation was not a factor in this paper becoming a Citation Classic!

"Probably Bellamy<sup>2</sup> would be the most useful recent general reference to infrared spectroscopy of complex molecules."

1. Gatehouse B M. Polystyrene-coated rock salt plates in infrared spectroscopy. *Chem. Ind. London* (41):1351-2, 1957.
2. Bellamy L J. *The infra-red spectra of complex molecules*. London: Chapman and Hall, 1975. 433 p.