RAMAN NEWSLETTER

Nos. 116/117 August/September 1978

THE NATIONAL RESEARCH FOUNDATION

48, V. Constantinou Ave.

Athens 501/1 - Greece

Resonance Raman Spectra of Suspensions.

The salt $[Pt(dapn)_2][Pt(dapn)_2Br_2](ClO_4)_4$

Resently we have reported resonance Raman spectra of mixed valence platinum compounds $Pt(en)X_3$ where X=Cl, Br [1]. In this letter we like to report resonance Raman spectra of suspensions of platinum salts. We will consider the salt $[Pt(dapn)_2][Pt(dapn)_2Br_2](ClO_4)_4$ (green) where, dapn=1,2-diaminopropane. This salt is soluble in water, methanol, acetone, acetonitrile and insoluble in carbon tetrachloride, carbon disulfide and ether. We make use of this property to prepare suspensions in the last three liquids.

The samples for electronic and Raman spectra were prepared as follows:
(a) $25mm^3$ of a saturated solution of the platinum compound in methanol were injected slowly into $18cm^3$ carbon tetrachloride and stirred vigorously. The suspension obtained takes a red colour and its electronic absorption spectrum is shown in figure 1a.
(b) $25mm^3$ of the same saturated solution in methanol were added at once into $2cm^3$ CCl_4 without stirring; after 2 minutes $16cm^3$ CCl_4 were added and the suspension was stirred. This sample has a violet colour and its electronic absorption spectrum is shown in figure 1b.

Electron micrographs show that the samples (a) and (b) consist of small particles of diameter 150 and 600 Å respectively. The same results are obtained if instead of methanol we use acetone or acetonitrile and carbon disulfide or ether instead of carbon tetrachloride.

On figure 2 is shown the resonance Raman spectrum of a suspension of $[Pt(dapn)_2][Pt(dapn)_2Br_2](ClO_4)_4$ in ether. Ether was used instead of CCl_4 in order to avoid the strong Raman bands of CCl_4 in the spectrum of suspension. Same results have been obtained with suspensions of analogous compounds of the type $[Pt(L\text{-}L)_2][Pt(L\text{-}L)_2X_2](ClO_4)_4$ where (L-L)=1,2-diaminoethane or 1,2-diaminopropane and X=Cl, Br or I. The concentrations of the suspensions were of the order of 10^{-5}M.

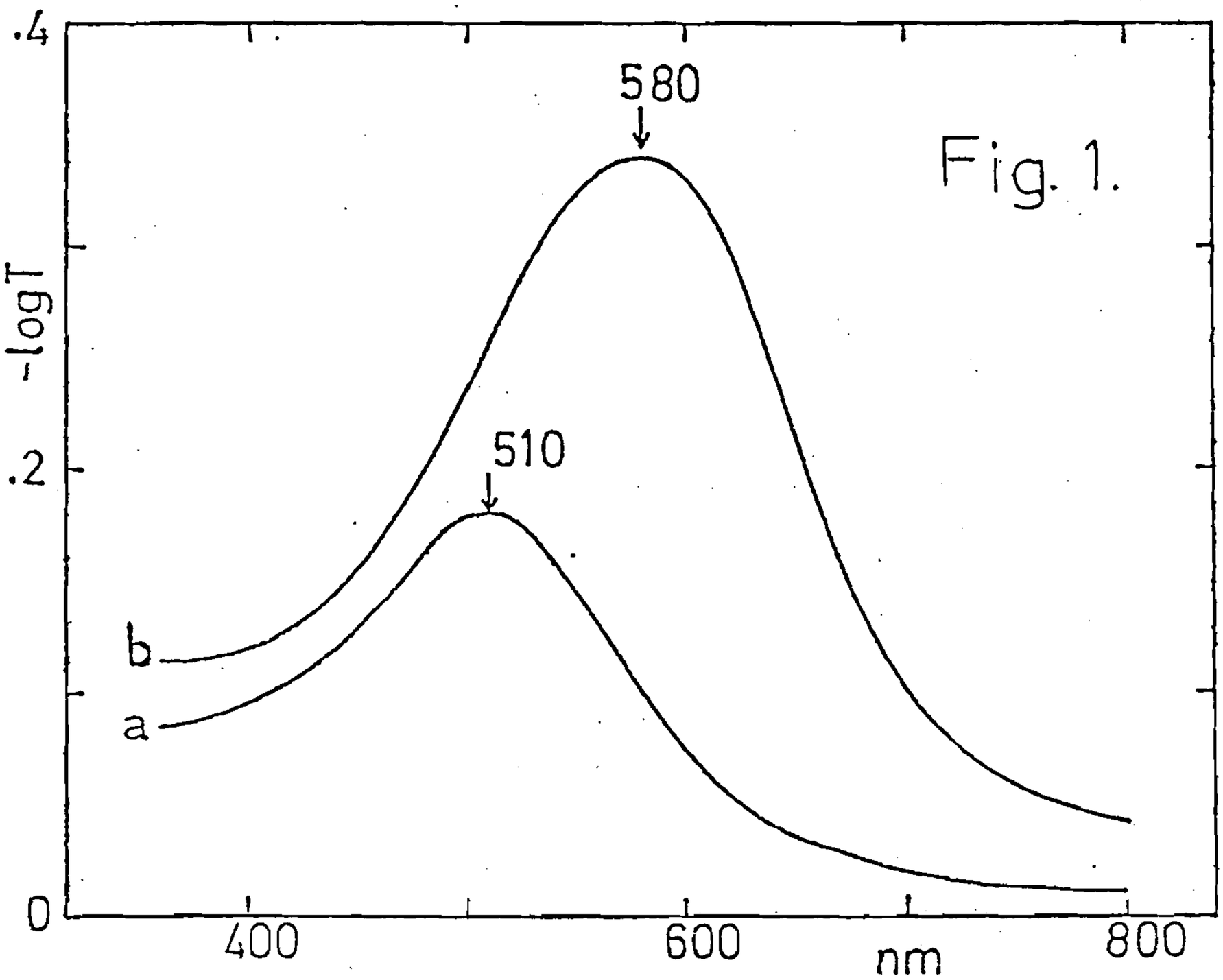
.4
.2
0
-logT
580
510
b
a
400
600
800
nm

Fig. 1.

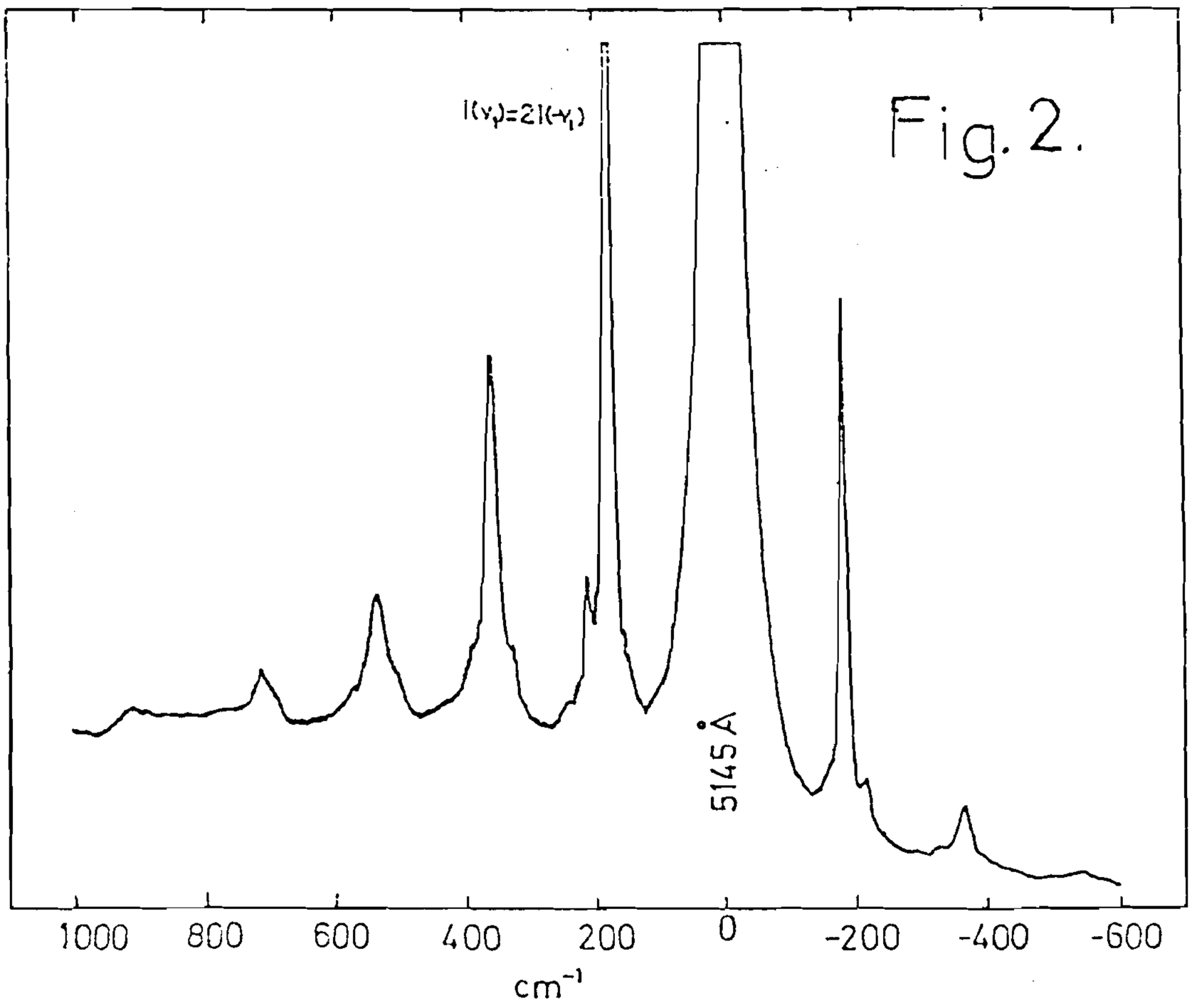
I(ν2)=2I(ν1)
5145 Å
1000
800
600
400
200
0
-200
-400
-600
cm⁻¹

Fig. 2.

The Raman spectra were taken with a JOBIN YVON Ramanor HG-2S Spectrometer and a Spectra Physics Model 165-03 Ar ion laser. The required power of the laser was 20mW.

The low concentrations of the salts used and the excellent quality of the resonance Raman spectra shows promise of recording resonance spectra of such compounds insoluble in non-polar solvents. This suspension technique could very well be applied in recording resonance Raman spectra of suspensions of biological polymers at low concentration.

G.C. Papavassiliou, T. Theophanides

[1] G.C. Papavassiliou, T. Theophanides, J. Raman Spectrosc., in press; Raman Newslett. 104, 140(1977)