

APPENDIX A

Our work on the lower-valent manganese oxides is summarized in this appendix. Table 1A contains information on sample locality and purity. Figures 1A-8A are representative of the various manganese oxides listed in Table 1A. They were all obtained on TlBr pellets under the same conditions as the figures presented in the text. Where the corresponding spectrum in KBr differs significantly it is included in Appendix B. Spectra of samples in Table 1A not included in this appendix are contained in Appendix B as indicated in Table 1A.

Table 1A. Sample information¹

| sample # | locality | ident. # | ref. # | fig. # | x-ray | IR | purity |
|----------|-----------------------------|-------------|--------|---------|--------|----|---------|
| 70 | Palos Verdes, Hills, Calif. | CIT 9461 | 2 | 1A | pure | | pure |
| 71 | Guyuna Range, Minnesota | NMNH 105004 | 3 | 2A, 16B | pure | | pure |
| 72 | Talcville, New York | NMNH 113969 | 4 | 16B | | | pure |
| 73 | Anadia, Portugal | NMNH 133850 | | 16B | | | t,qtz |
| 74 | Langban, Sweden | CIT 9462 | | 17B | | | pure |
| 75 | Synthetic | CIT 9463 | 5 | 3A, 17B | pure | | pure |
| 76 | Synthetic | CIT 9618 | 6 | 17B | | | pure |
| 77 | Sagamore Mine, Minnesota | CIT 6048 | 7 | 18B | t, imp | | pure |
| 78 | Synthetic | CIT 9619 | | 4A | pure | | pure |
| 79 | Langban, Sweden | CIT 2400 | | 19B | t, pyc | | t, pyc |
| 80 | Synthetic | CIT 9620 | 8 | 5A, 19B | | | pure |
| 81 | Tachgagalt, Morocco | LCM 13888 | | 6A | pure | | pure |
| 82 | Postmasburg, S. Africa | HAV 110400 | | 20B | | | pure |
| 83 | Synthetic | CIT 9621 | 9 | 7A | t, pyr | | t, pyr? |
| 84 | Langban, Sweden | CIT 3097 | | 8A | pure | | pure |

1. The abbreviations and the criteria for X-ray purity are the same as for Table 1.
 2. Mitchell and Corey, 1973.

3. Gruner, 1947

4. Segeler, 1959.

5. Synthetic method: Giovanoli *et al.*, 1967.

6. Manganous manganic oxide from Diamond Shamrock Chemical Company; Baltimore, Maryland.

7. Synthetic method: The synthetic method of Wadsley (1950b) for psilomelane produced a pure hausmannite. It was subsequently found that the manganous manganate used was contaminated with hausmannite.

8. Manganous oxide from Diamond Shamrock Chemical Company; Baltimore, Maryland; 0.01% Fe, 0.5% MnO₂ by their analysis.

9. Manganese sesquioxide HPX from Diamond Shamrock Chemical Company; Baltimore, Maryland.

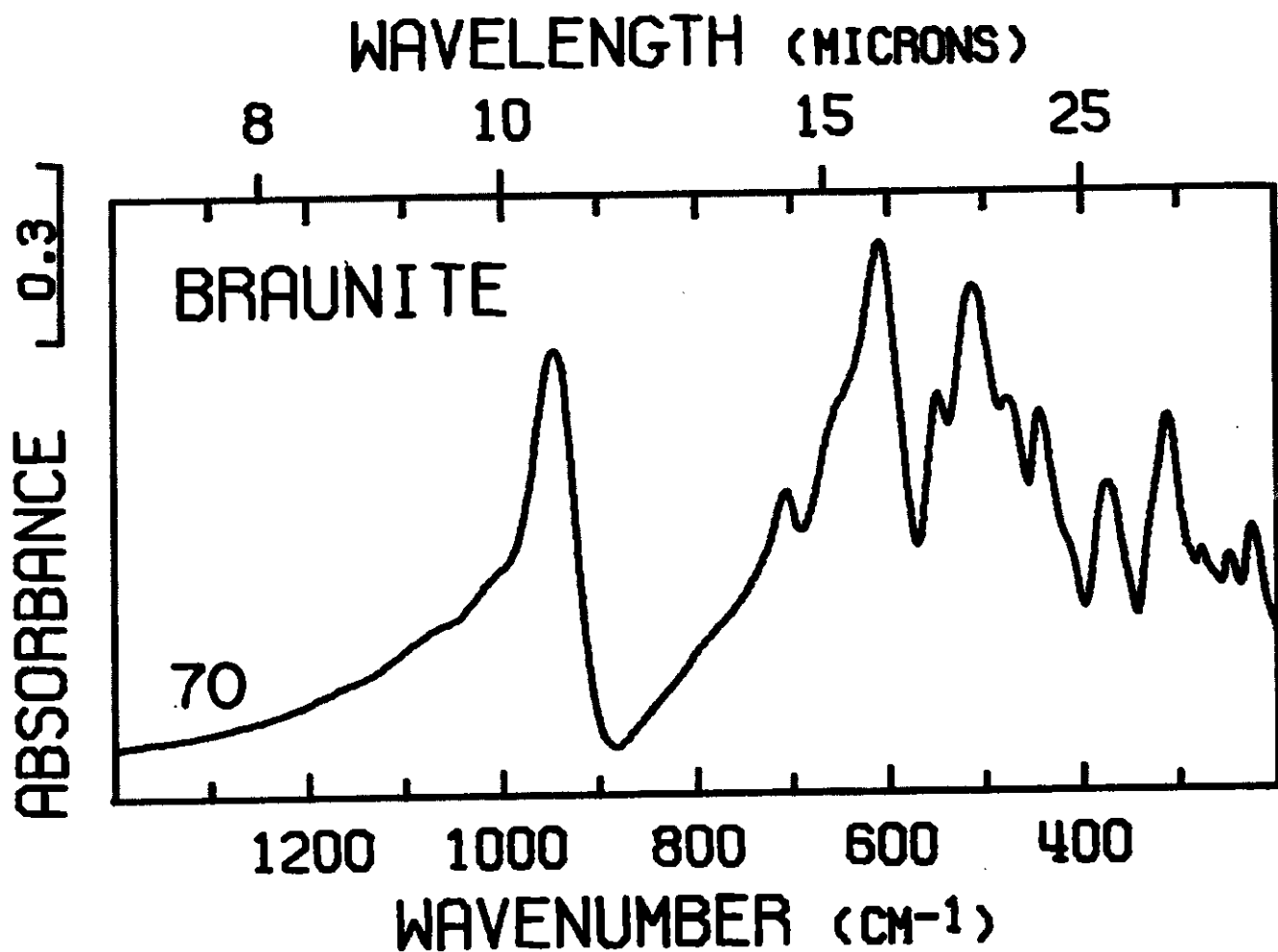


Figure 1A. Infrared spectrum of braunite. Presentation intensity: 344%.

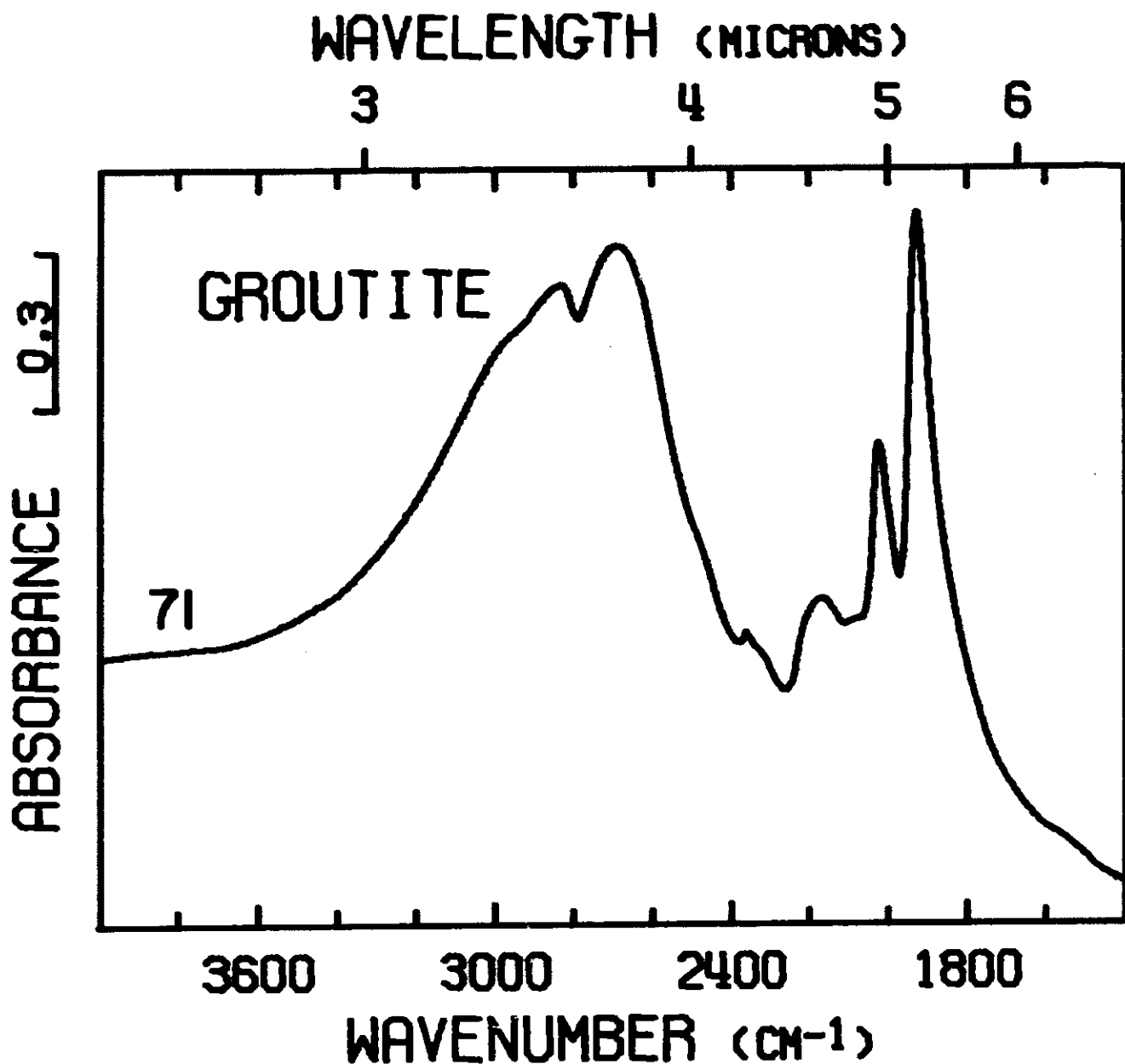


Figure 2A. Infrared spectrum of groutite. Presentation intensity: 268%. Figure continued on following page.

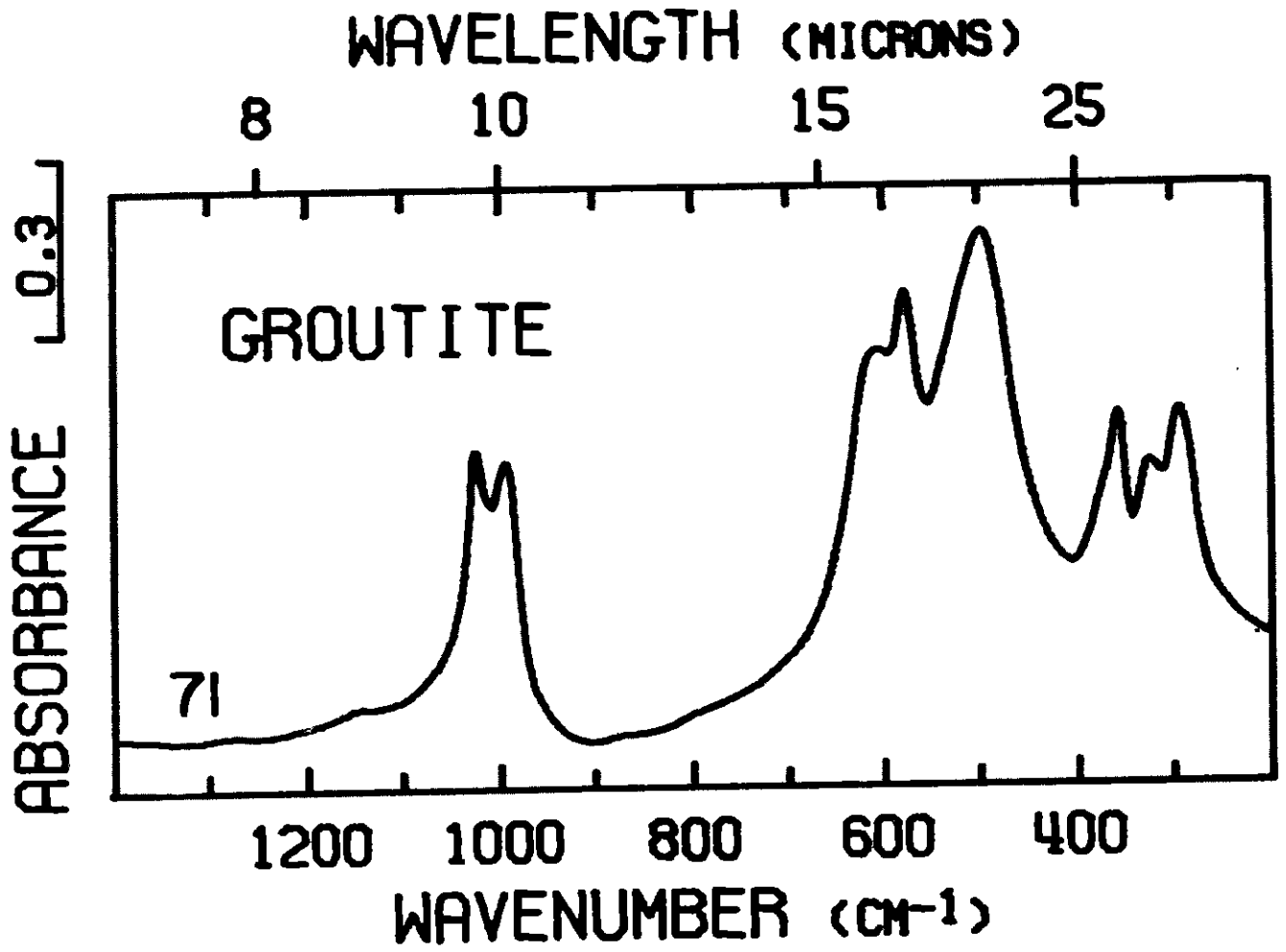


Figure 2A. Continued from preceding page.

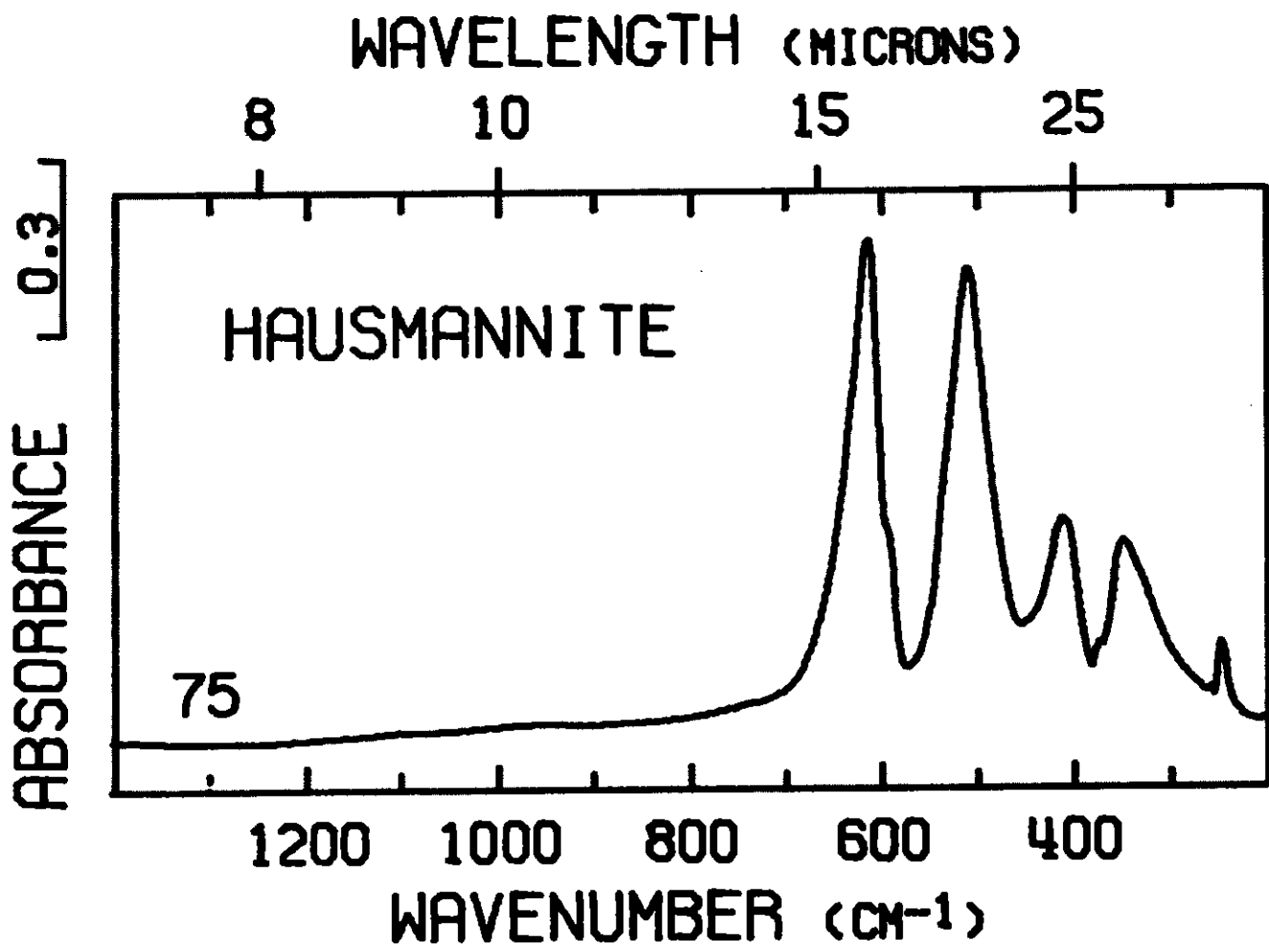


Figure 3A. Infrared spectrum of hausmannite. Presentation intensity: 182%.

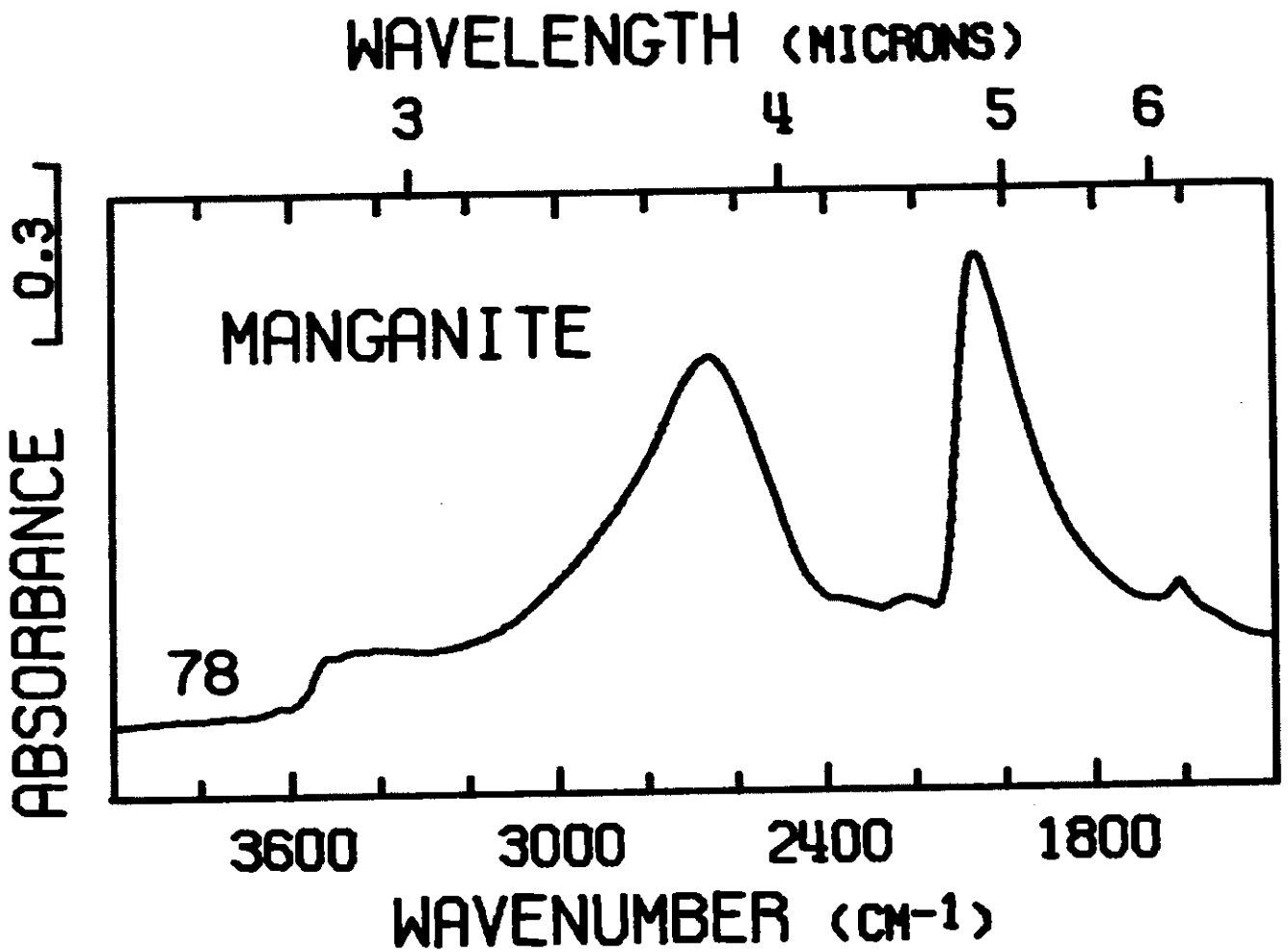


Figure 4A. Infrared spectrum of manganite. Presentation intensity: 81%. Figure continued on following page.

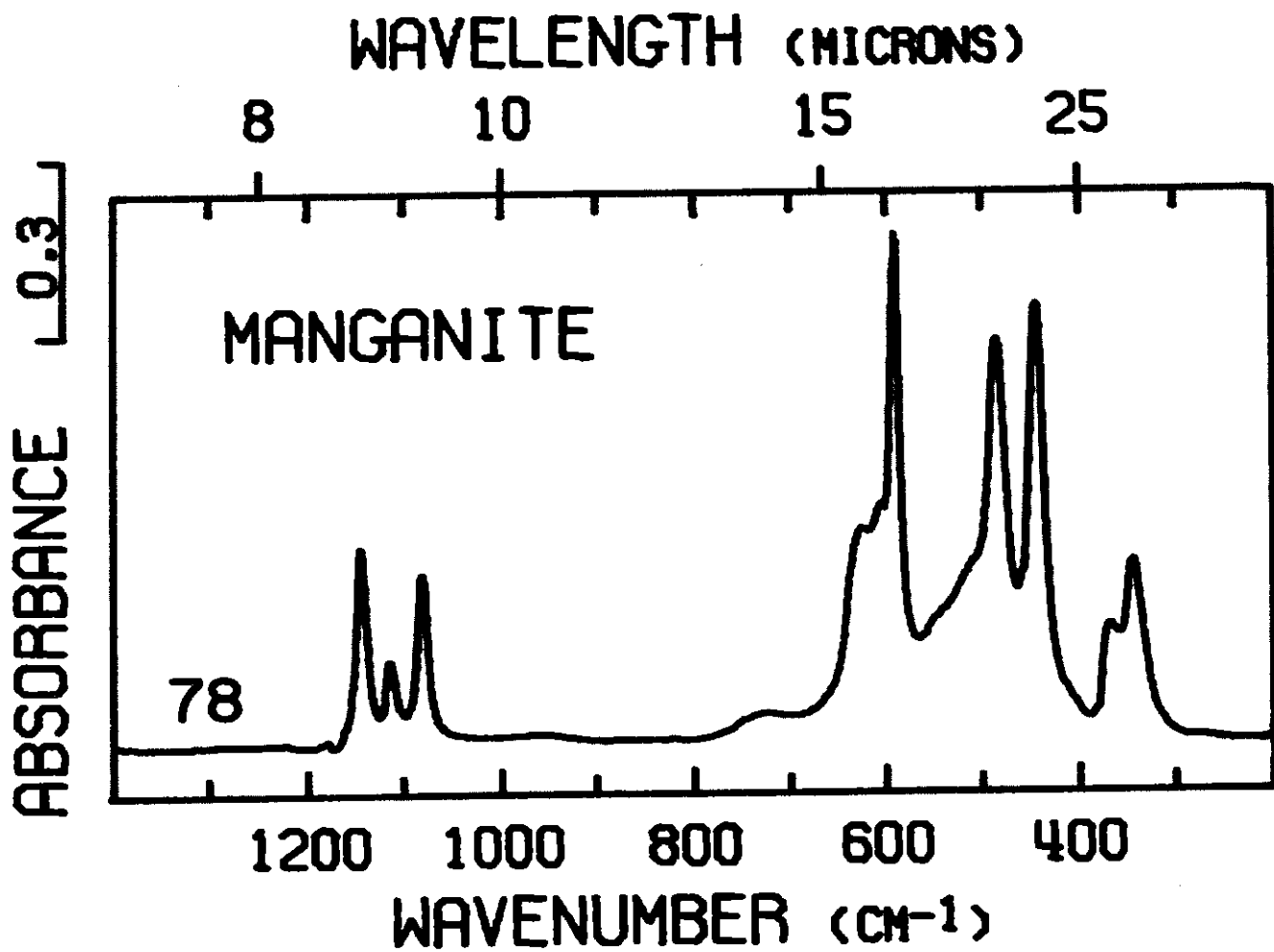


Figure 4A. Continued from preceding page.

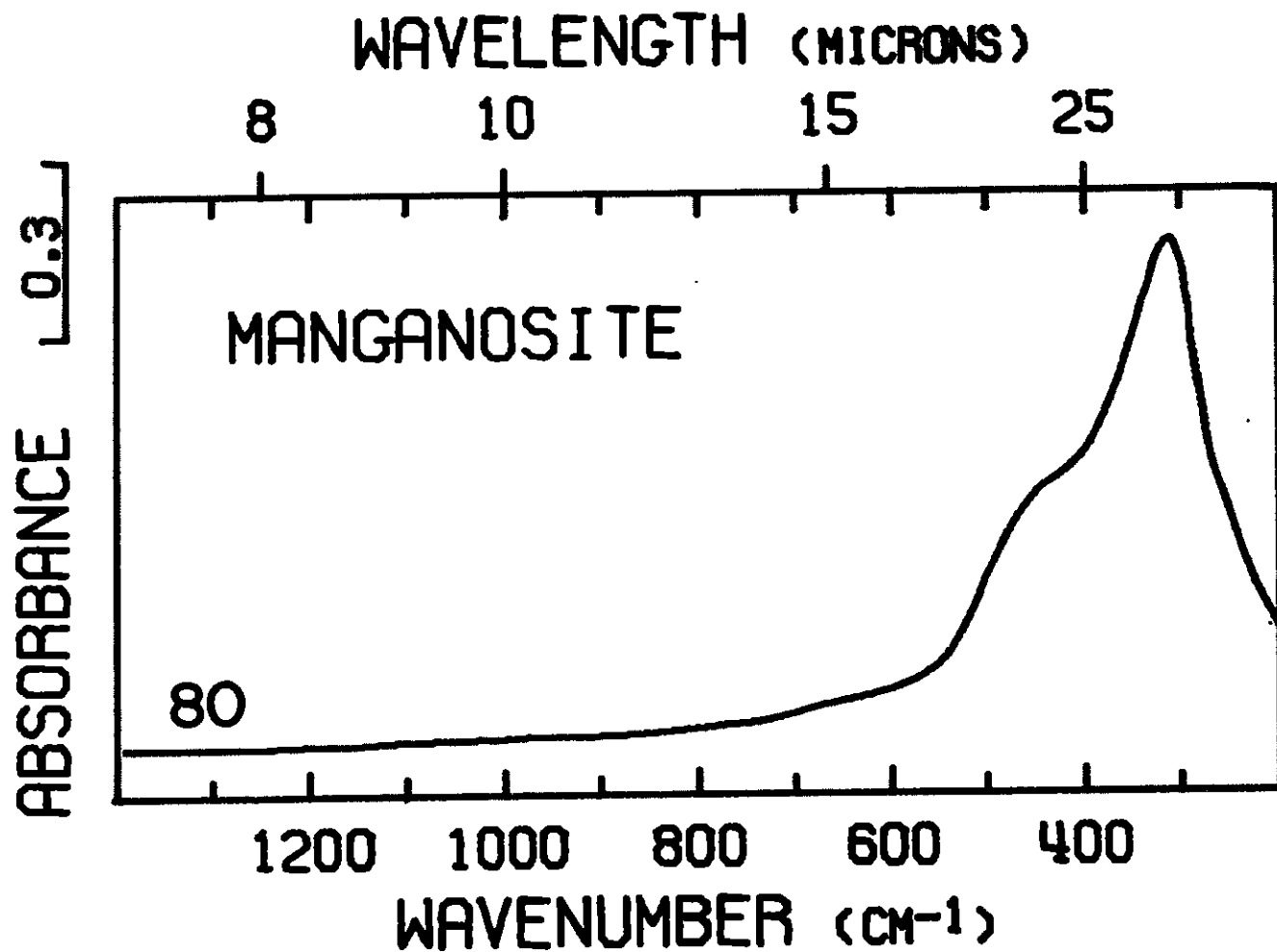


Figure 5A. Infrared spectrum of manganosite. Presentation intensity: 244%.

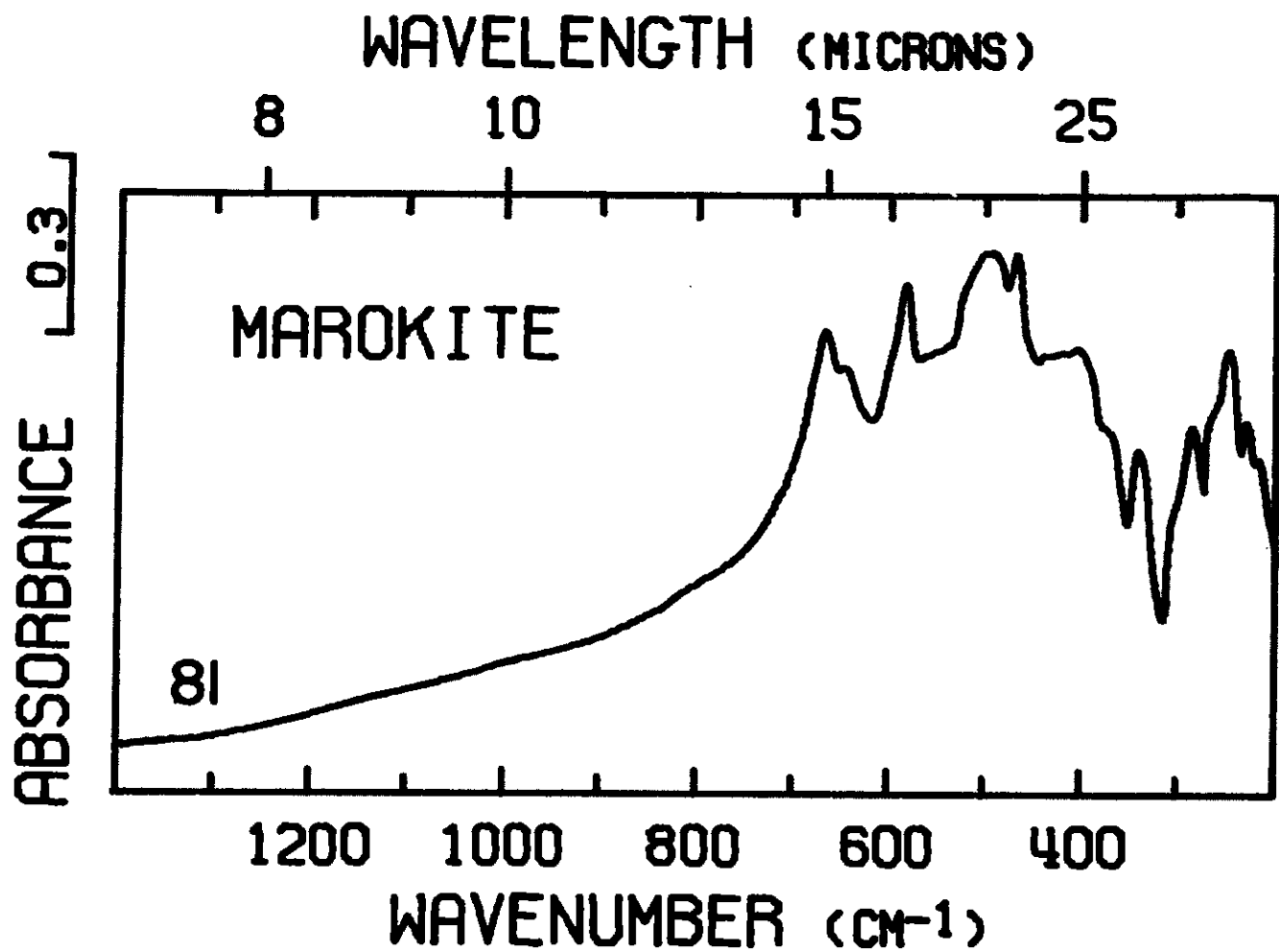


Figure 6A. Infrared spectrum of marokite. Presentation intensity: 414%.

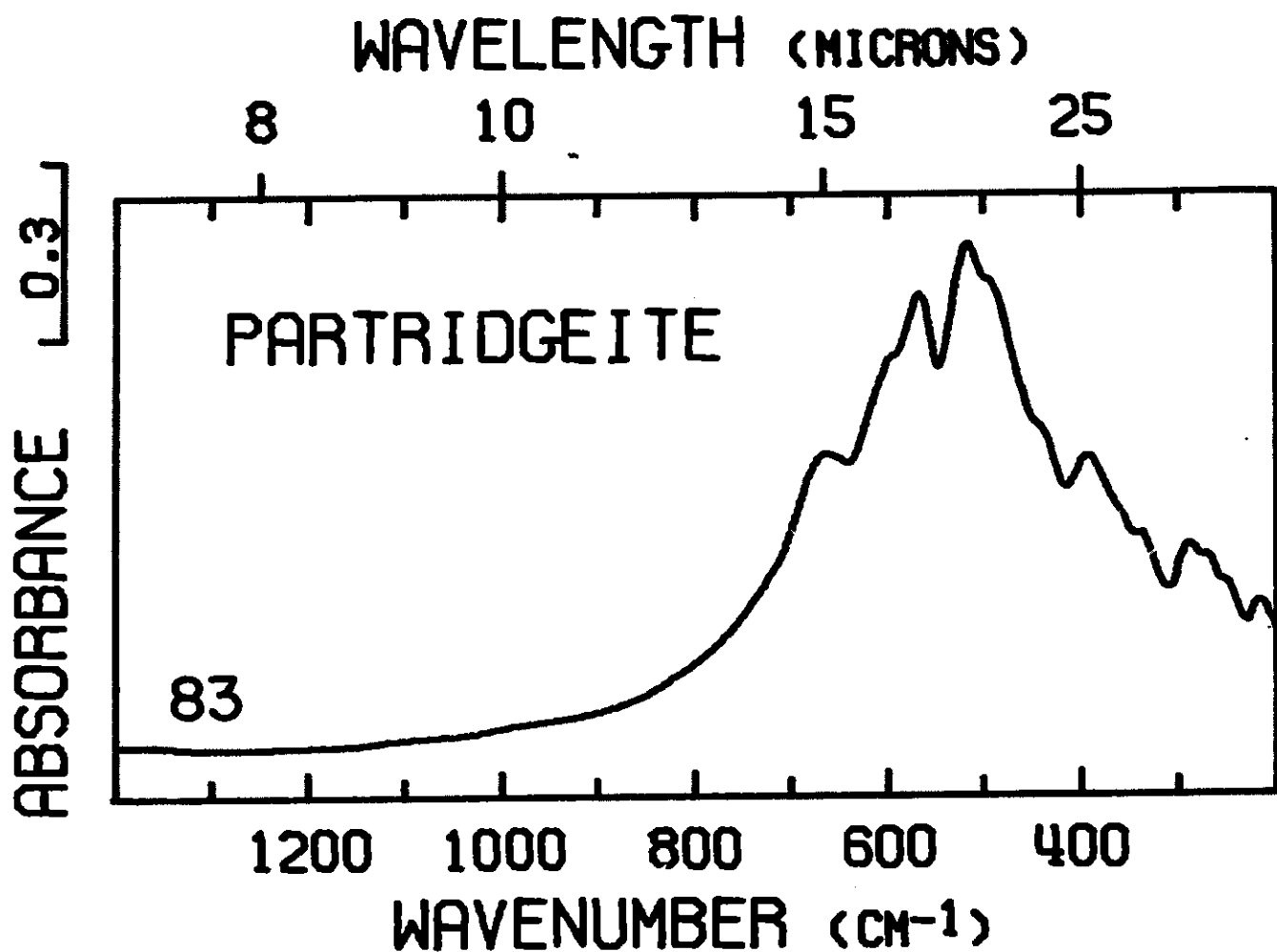


Figure 7A. Infrared spectrum of partridgeite. Presentation intensity: 248%.

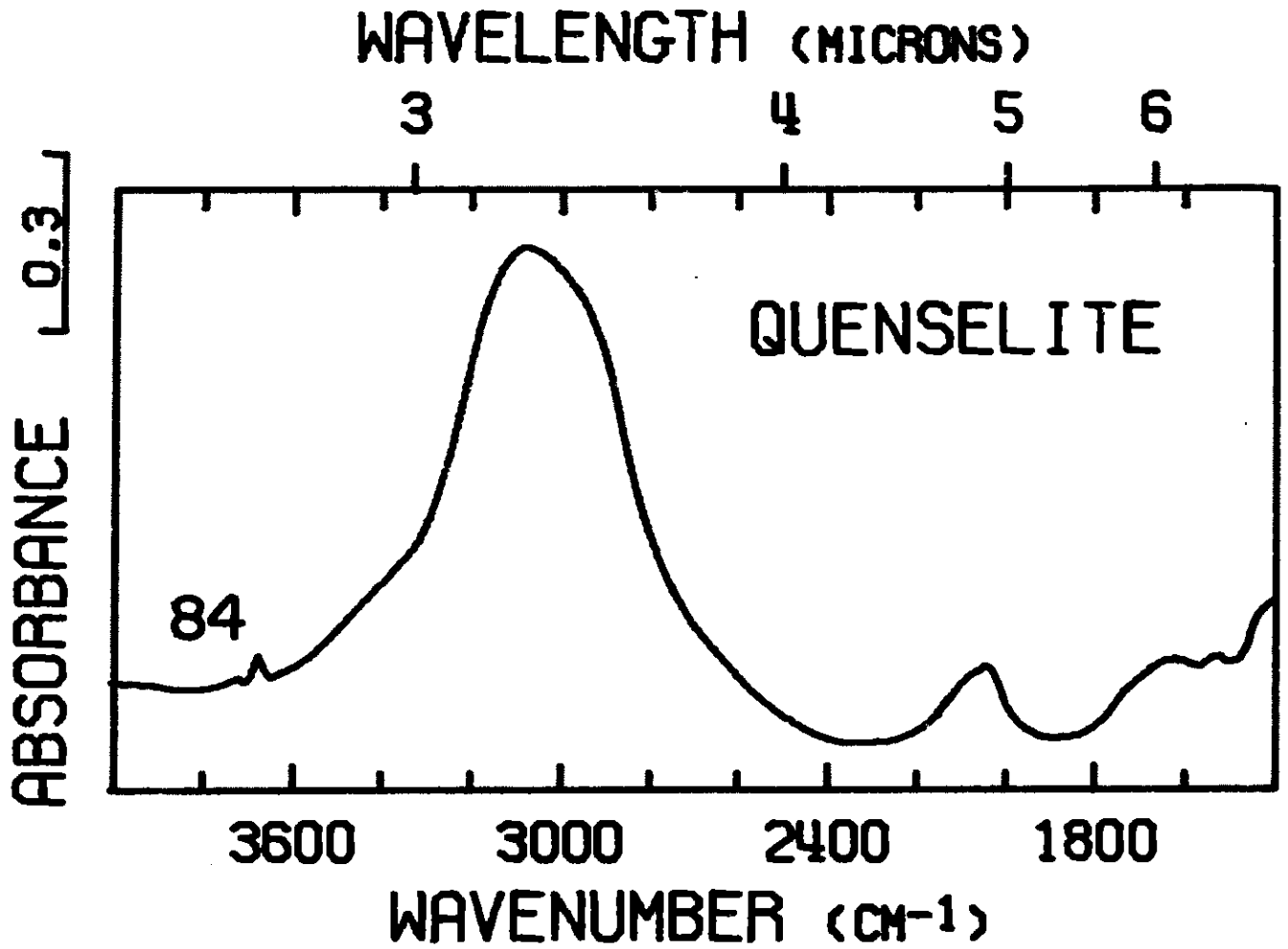


Figure 8A. Infrared spectrum of quenselite. Presentation intensity: 404%. Figure continued on following page.

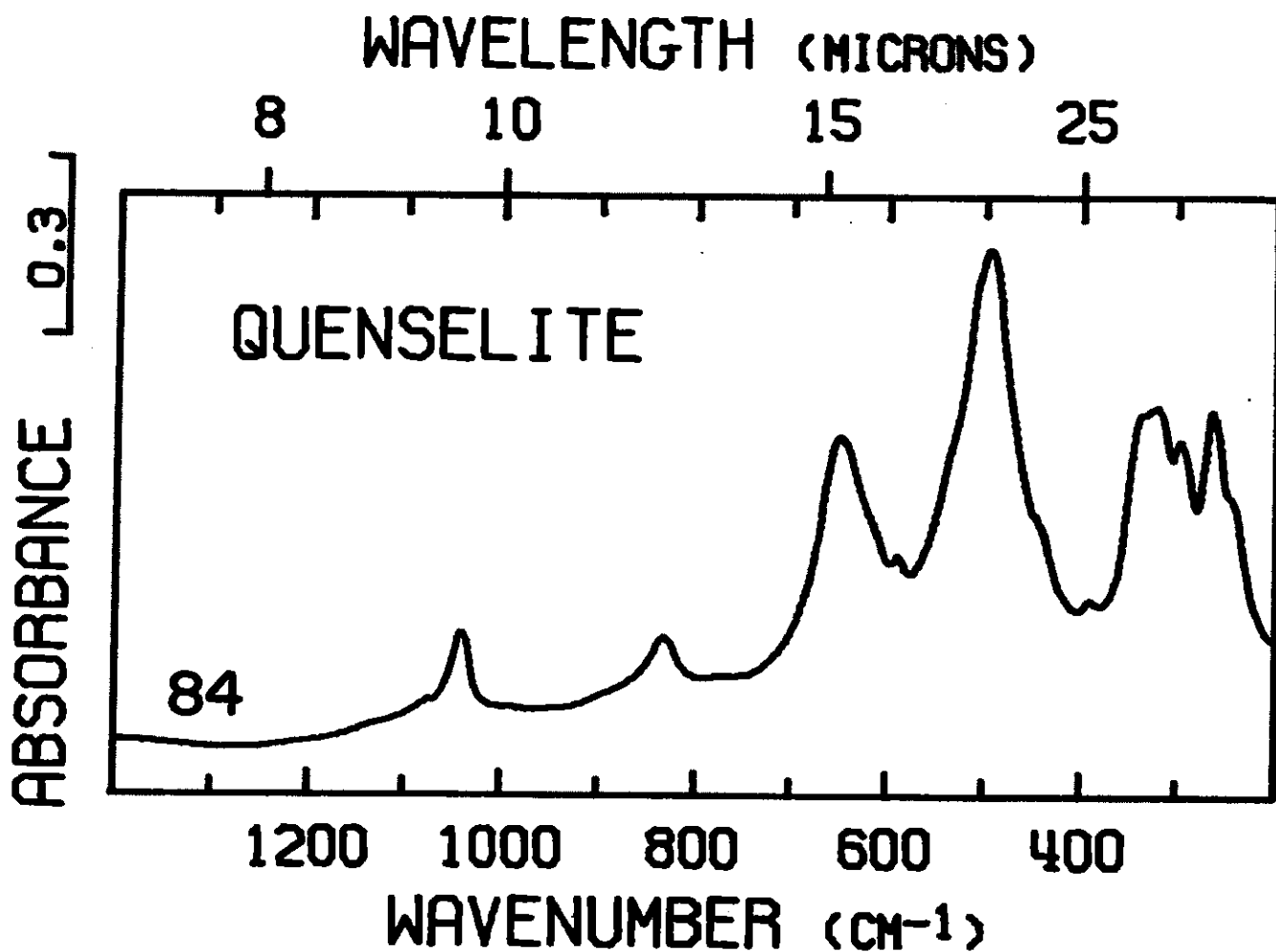


Figure 8A. Continued from preceding page.