

## Supplementary Data

### **Electrophilic Chemistry of Propargylic Alcohols in Imidazolium Ionic Liquids: Propargylation of Arenes and Synthesis of Propargylic Ethers Catalyzed by Metallic Triflates [Bi(OTf)<sub>3</sub>, Sc(OTf)<sub>3</sub>, Yb(OTf)<sub>3</sub>, TfOH, or B(C<sub>6</sub>F<sub>5</sub>)<sub>3</sub>]**

Gopalakrishnan Aridoss, Viorel D. Sarca, James Ponder, Jessica Crowe, Kenneth K. Laali\*

Department of Chemistry, University of North Florida, 1, UNF Drive, Jacksonville, Florida, 32224, USA

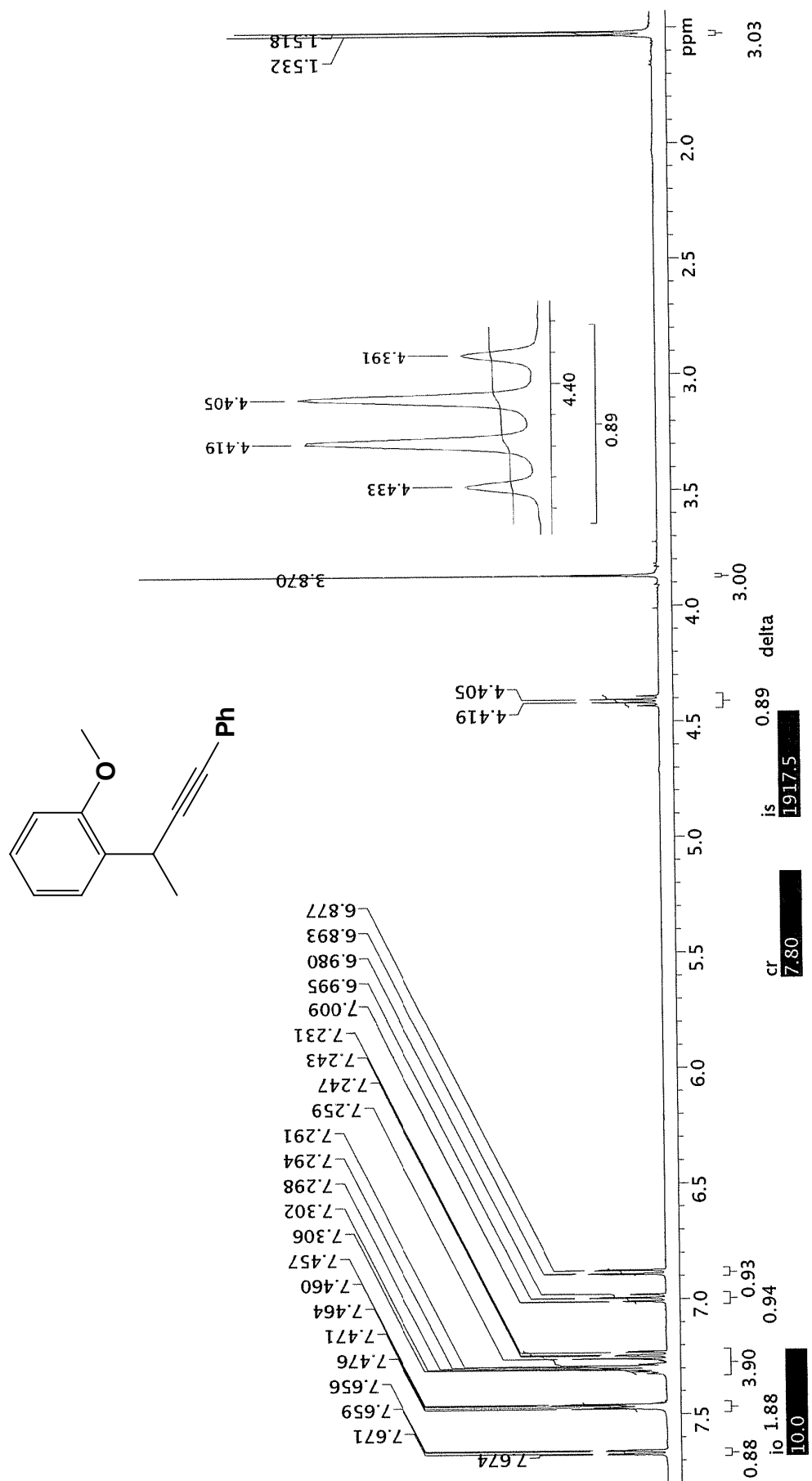


Figure 1.  $^1\text{H}$  NMR of compound 2

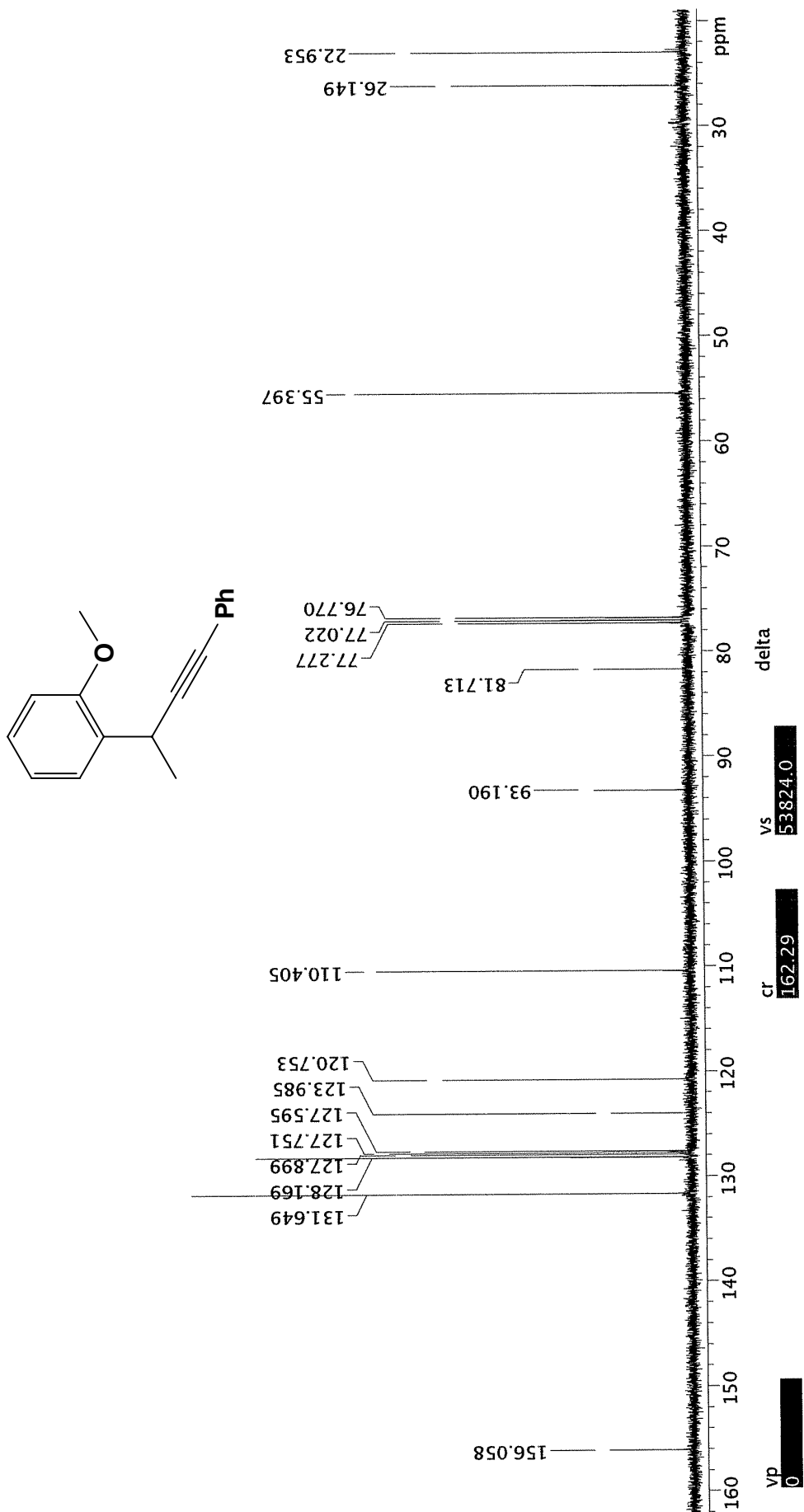


Figure 2.  $^{13}\text{C}$  NMR of compound 2

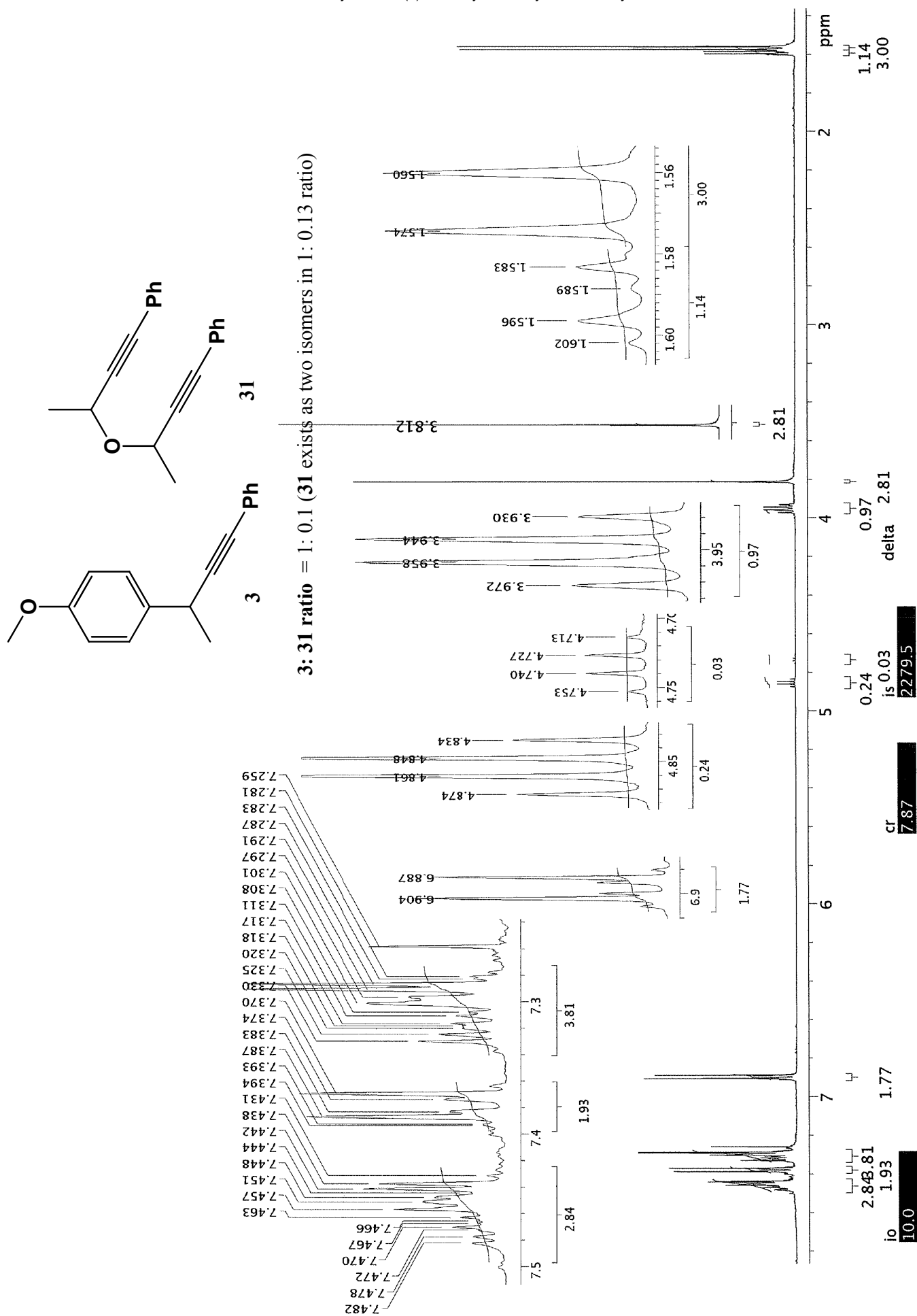


Figure 3. <sup>1</sup>H NMR of compound 3

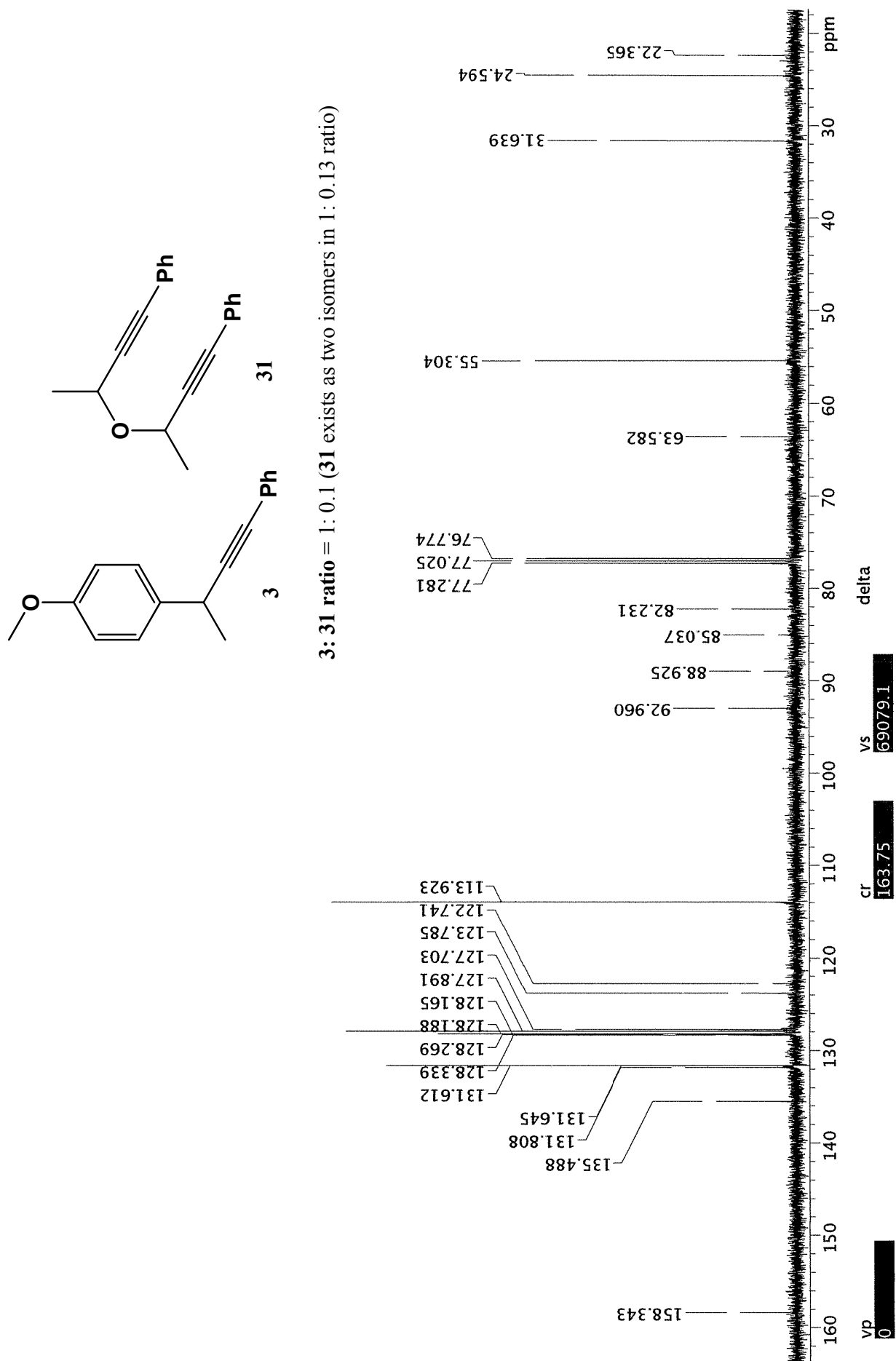


Figure 4. <sup>13</sup>C NMR of compound 3

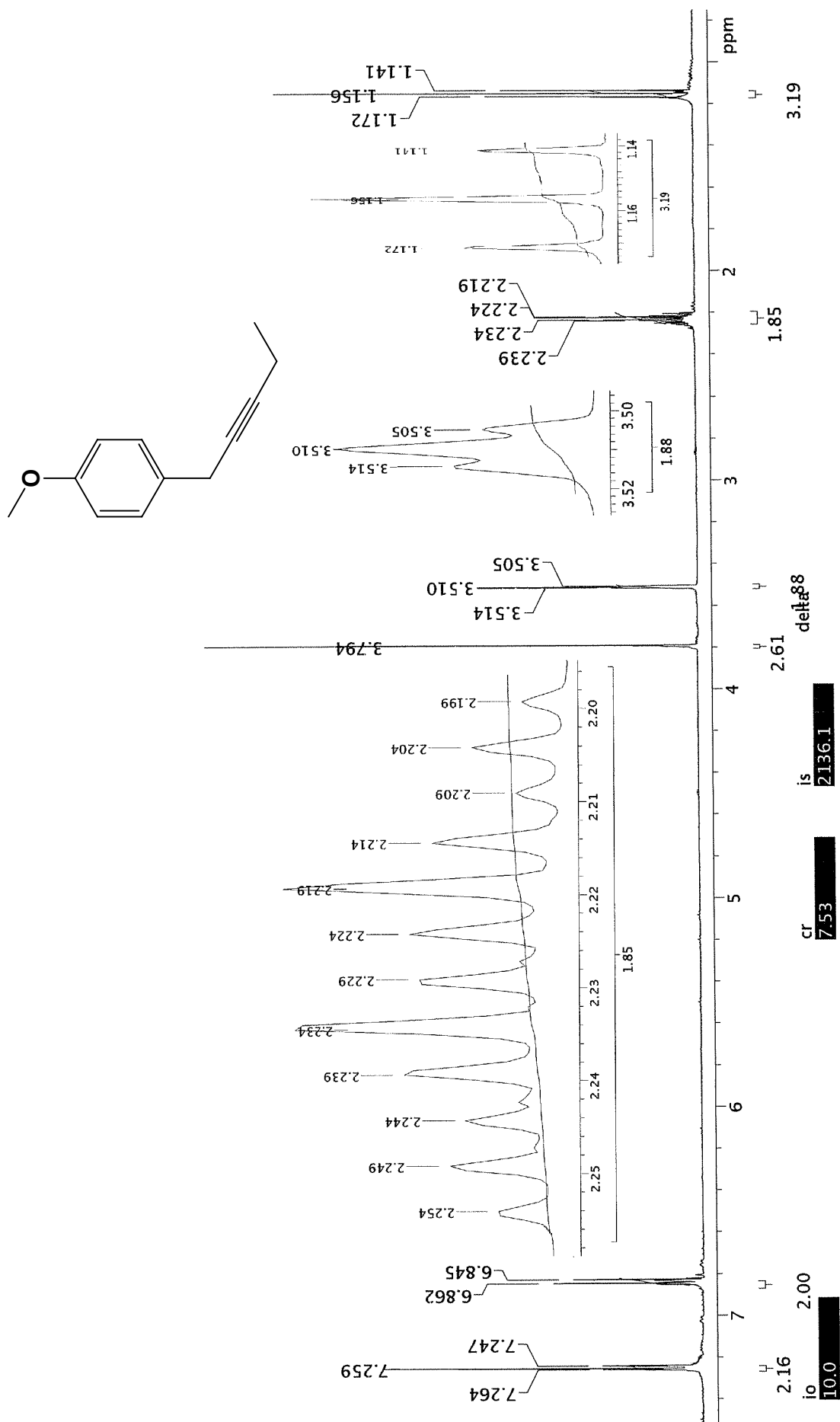


Figure 5. <sup>1</sup>H NMR of compound 4

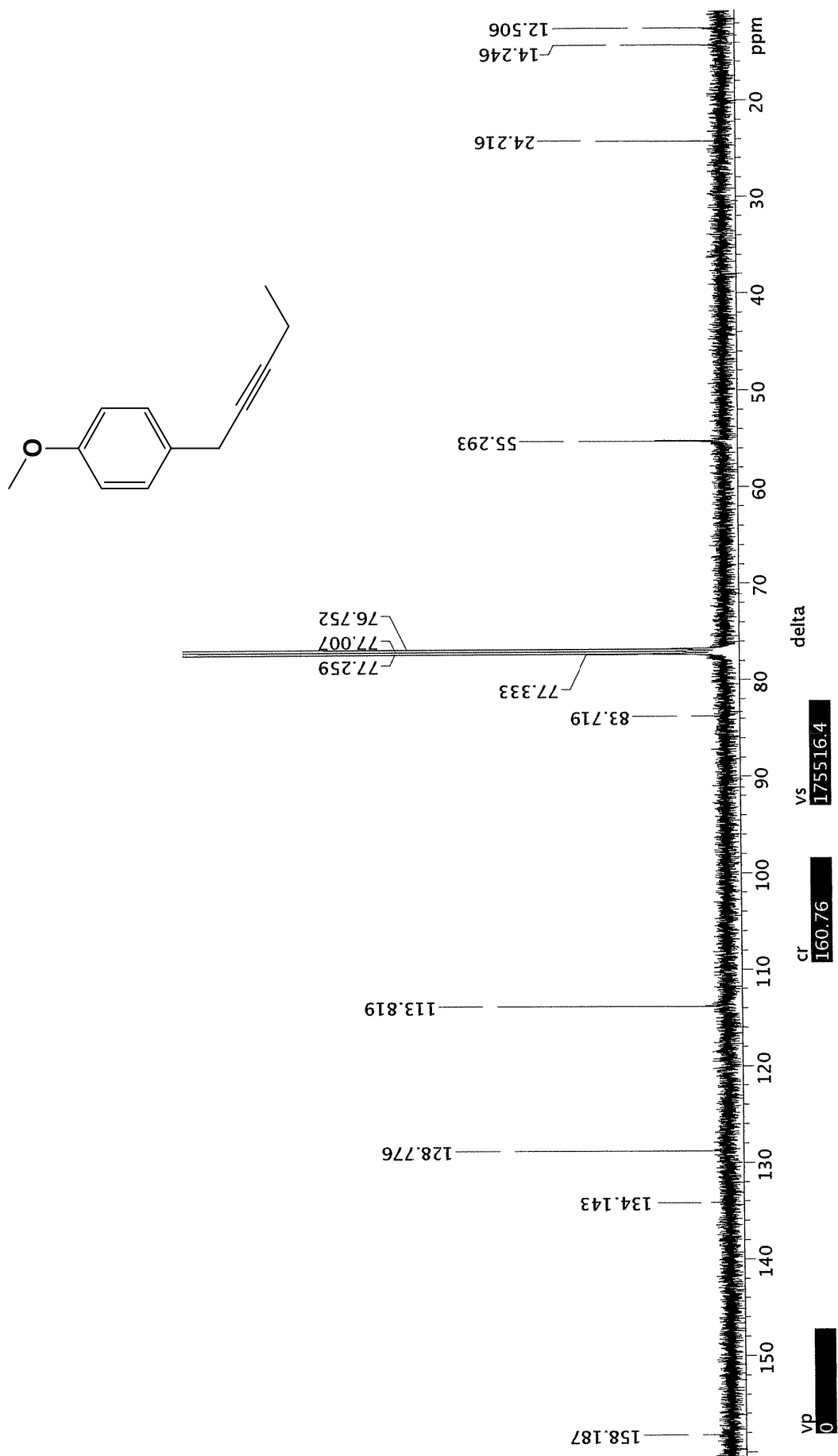


Figure 6. <sup>13</sup>C NMR of compound 4

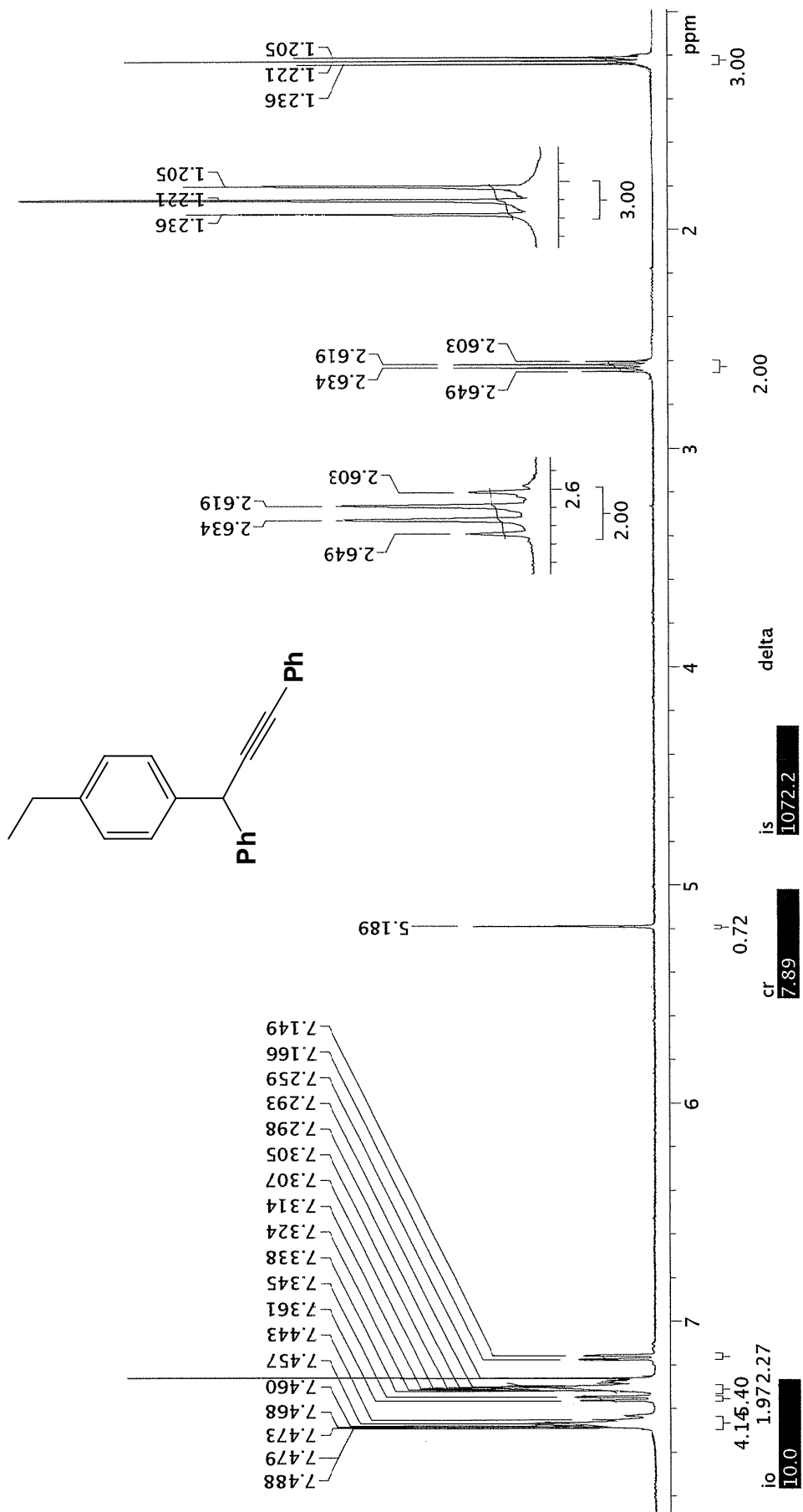


Figure 7. <sup>1</sup>H NMR of compound 10



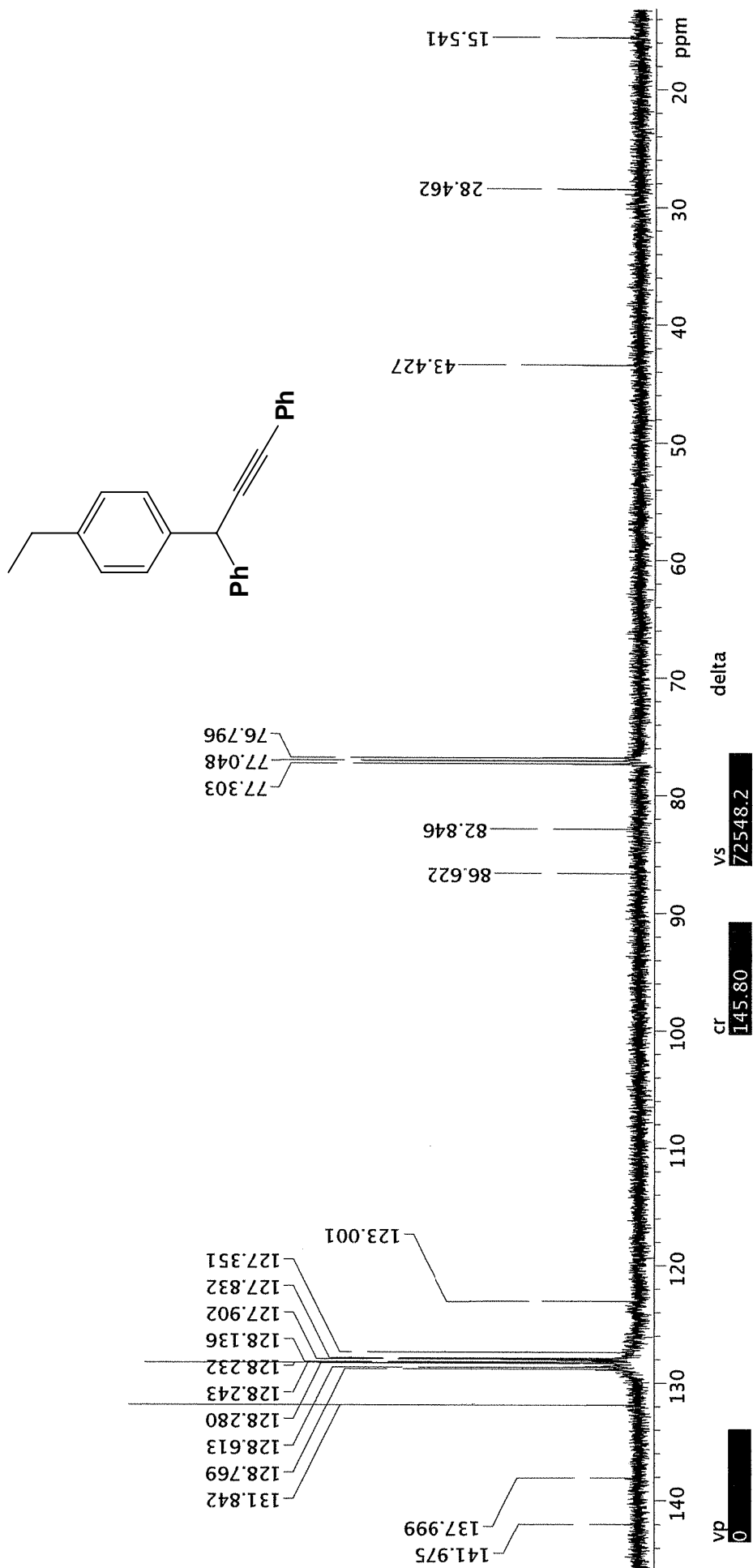


Figure 8.  $^{13}\text{C}$  NMR of compound 10

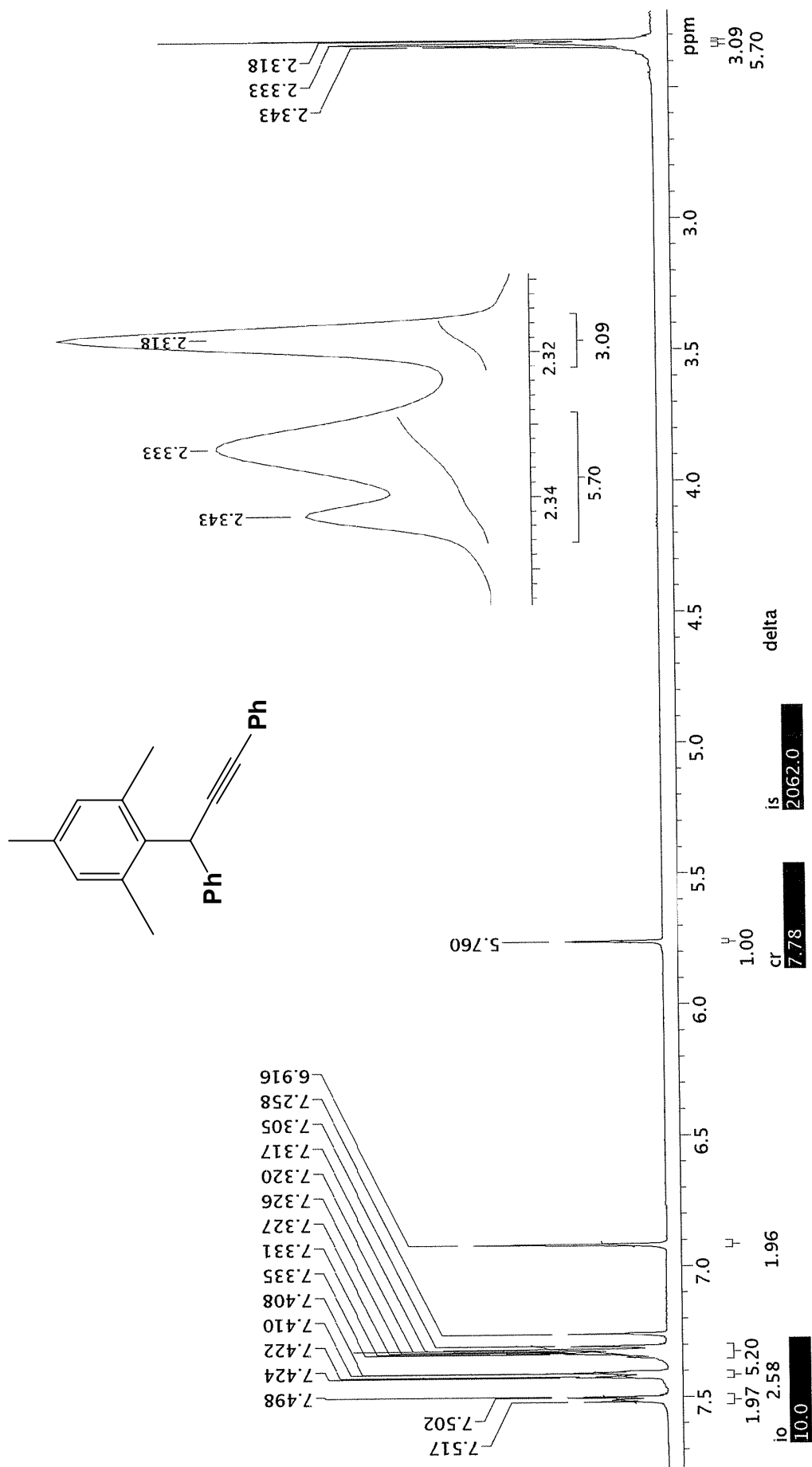


Figure 9. <sup>1</sup>H NMR of compound 11

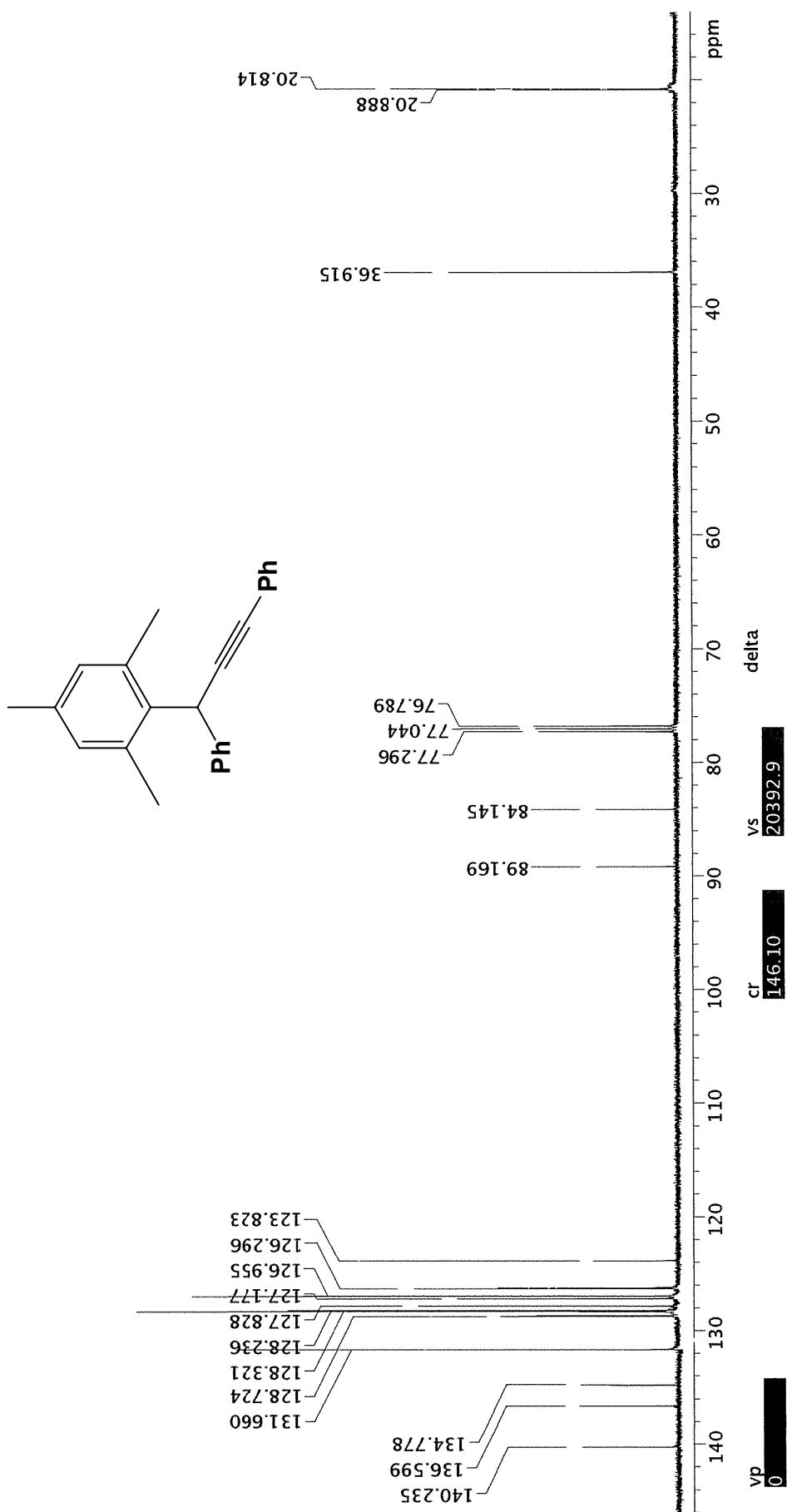


Figure 10.  $^{13}\text{C}$  NMR of compound 11

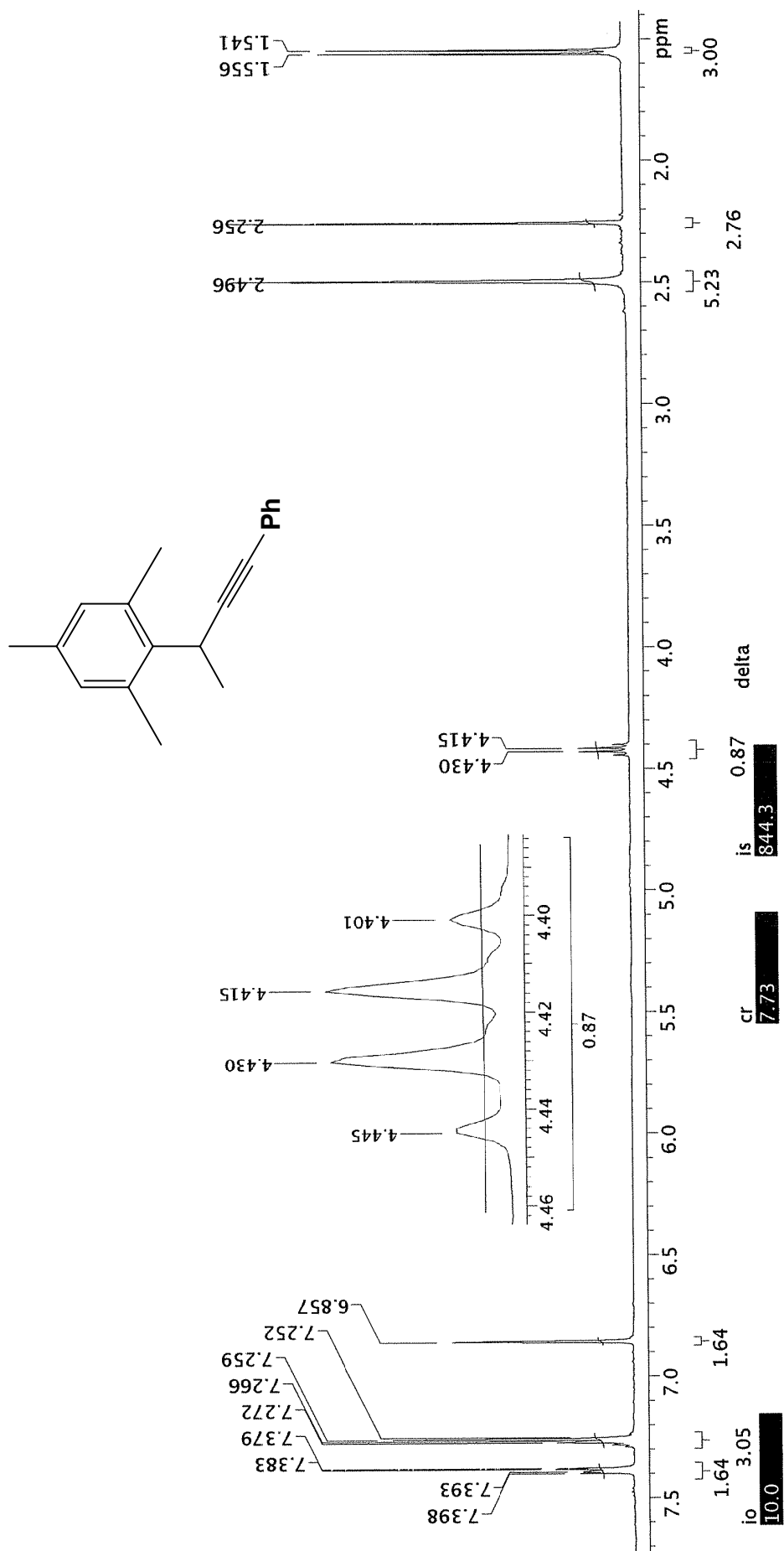


Figure 11. <sup>1</sup>H NMR of compound 12

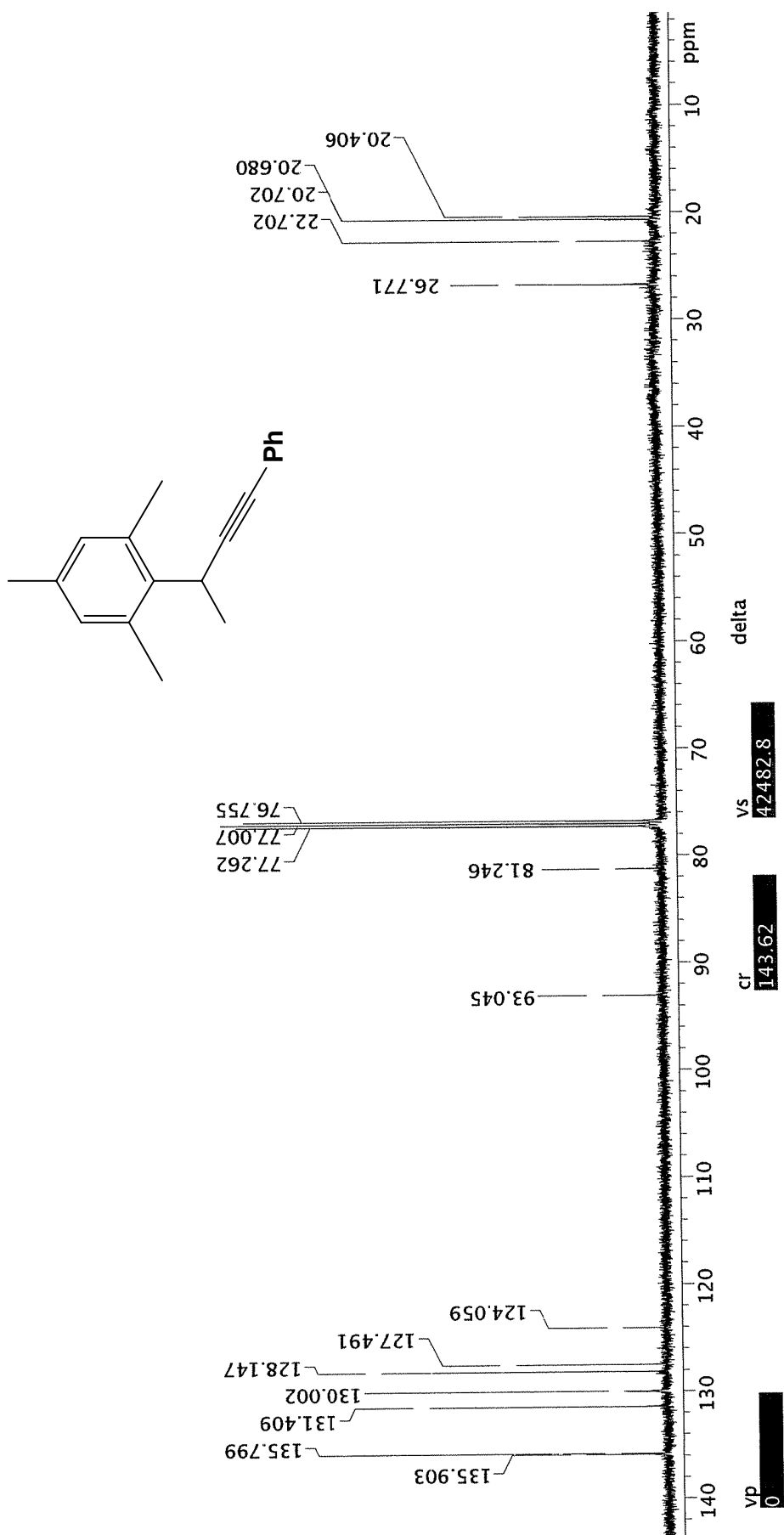


Figure 12.  $^{13}\text{C}$  NMR of compound 12

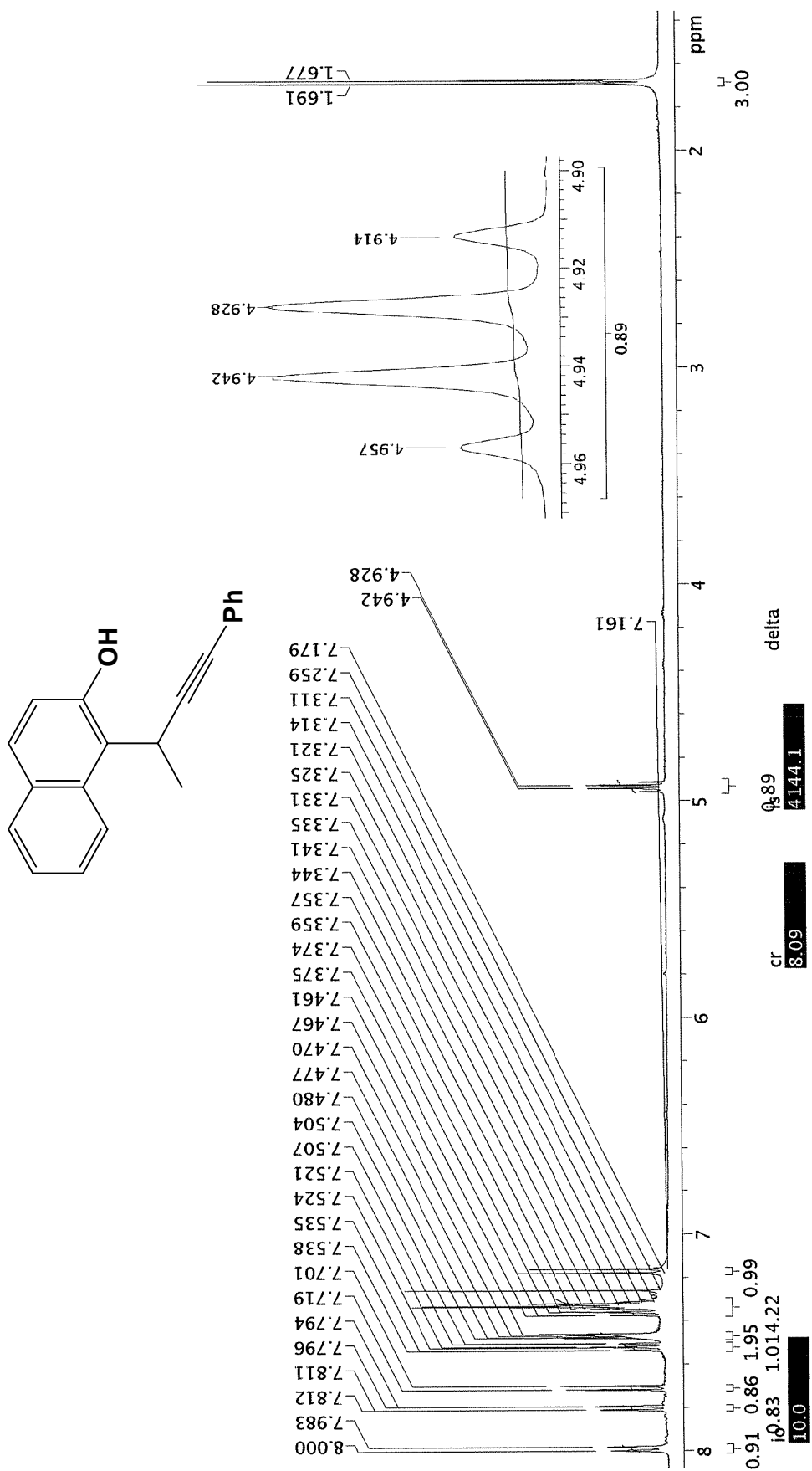


Figure 13. <sup>1</sup>H NMR of compound 16

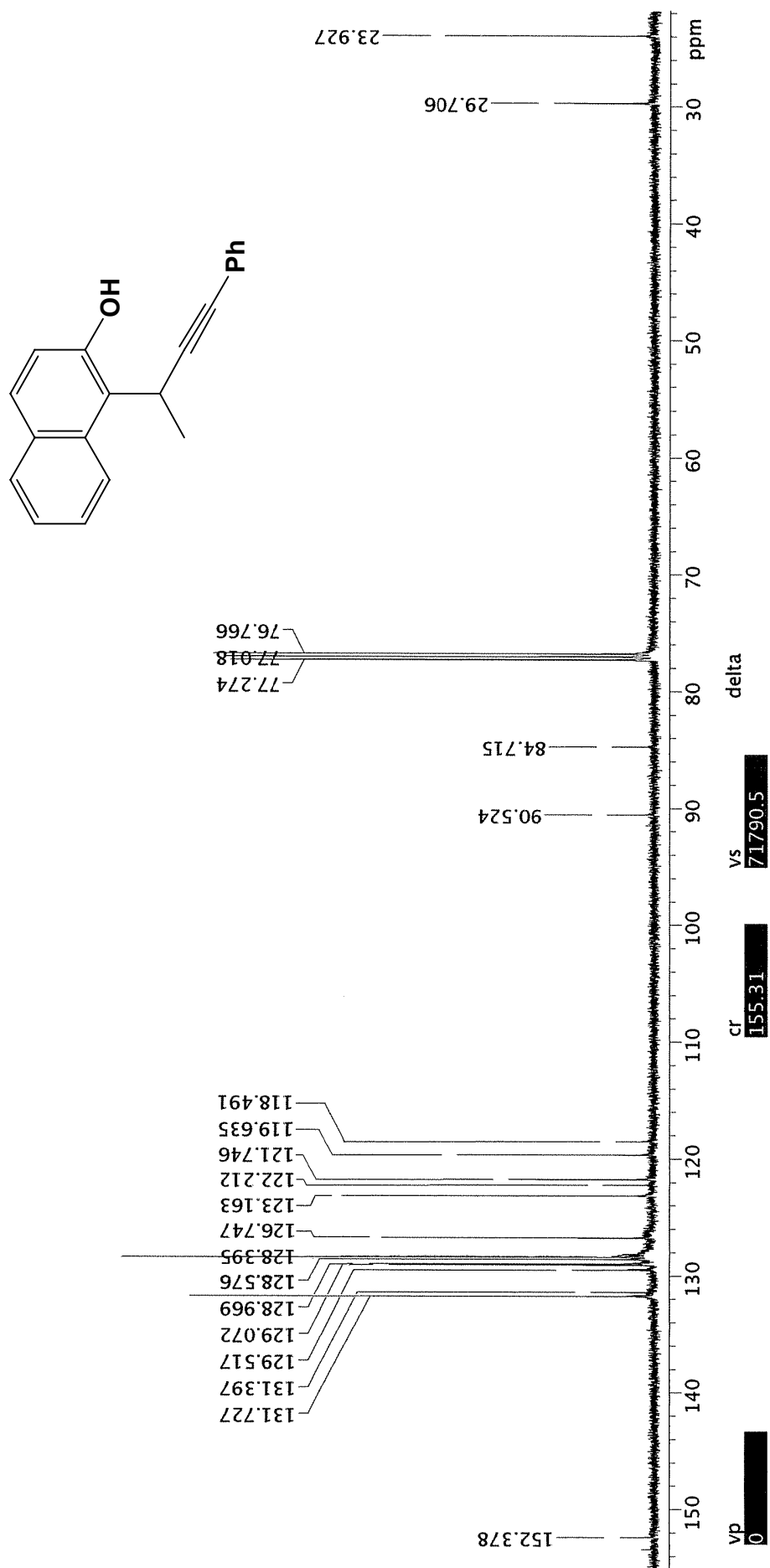


Figure 14.  $^{13}\text{C}$  NMR of compound 16

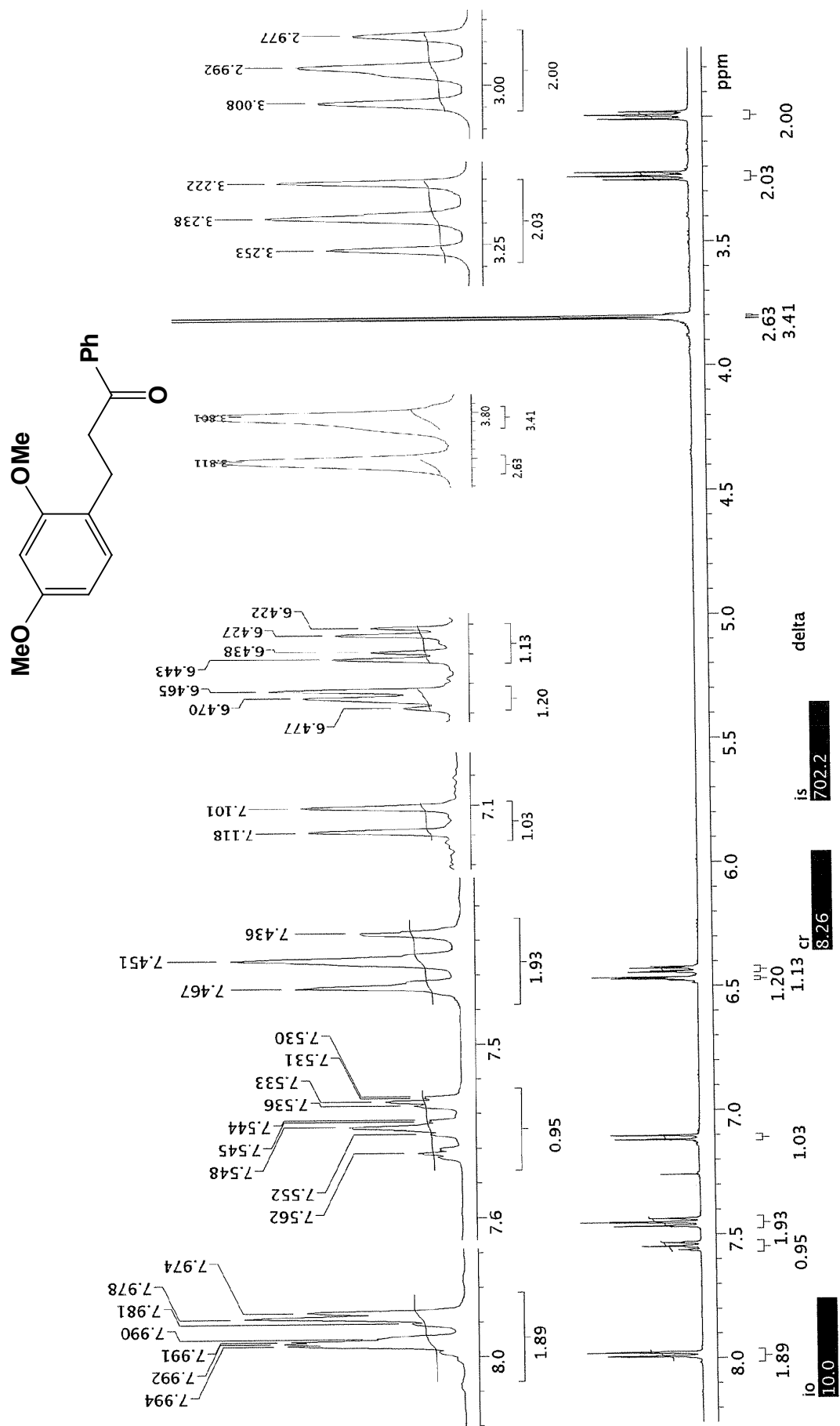


Figure 15. <sup>1</sup>H NMR of compound 23



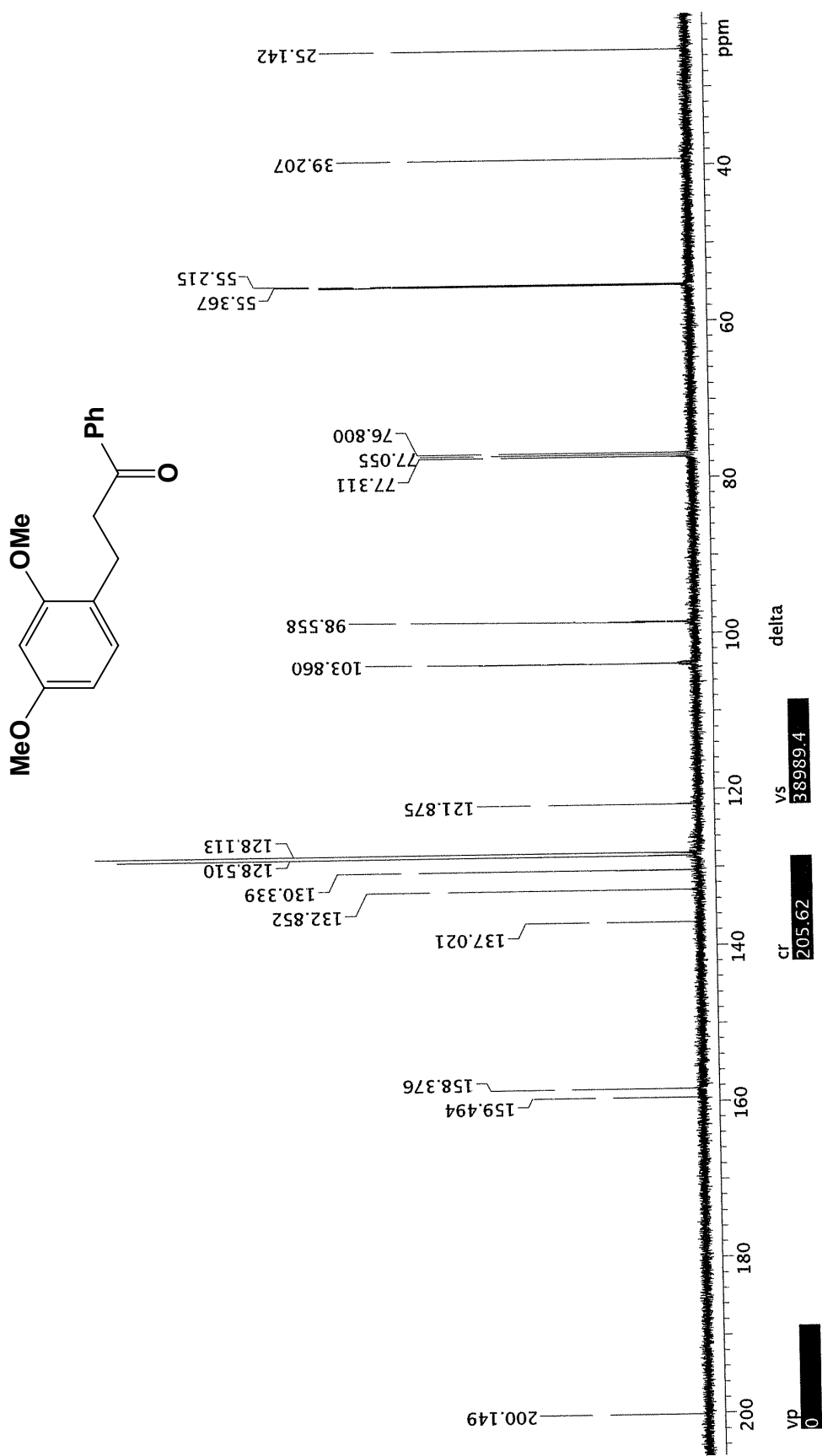


Figure 16.  $^{13}\text{C}$  NMR of compound 23

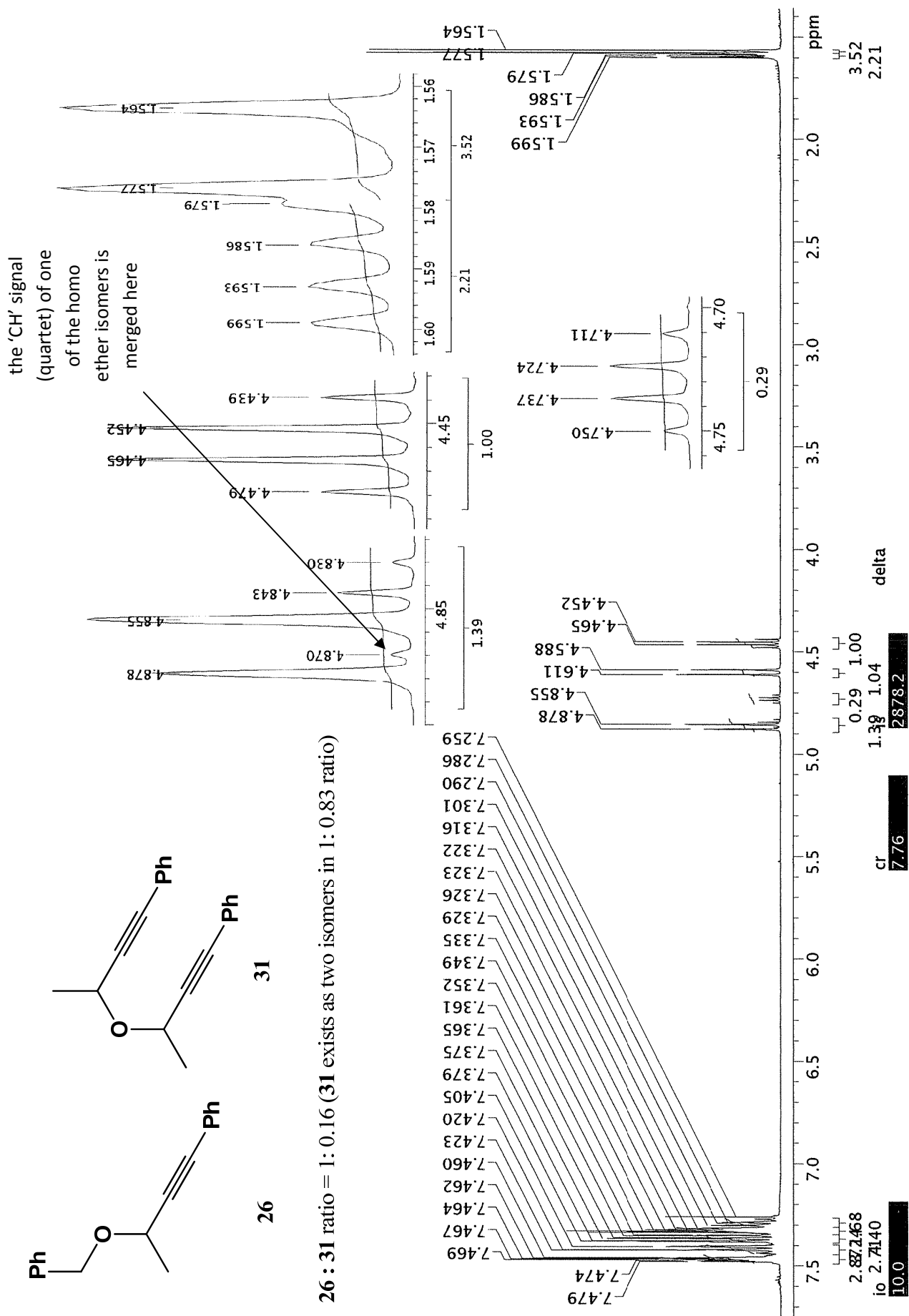


Figure 17. <sup>1</sup>H NMR of compound 26

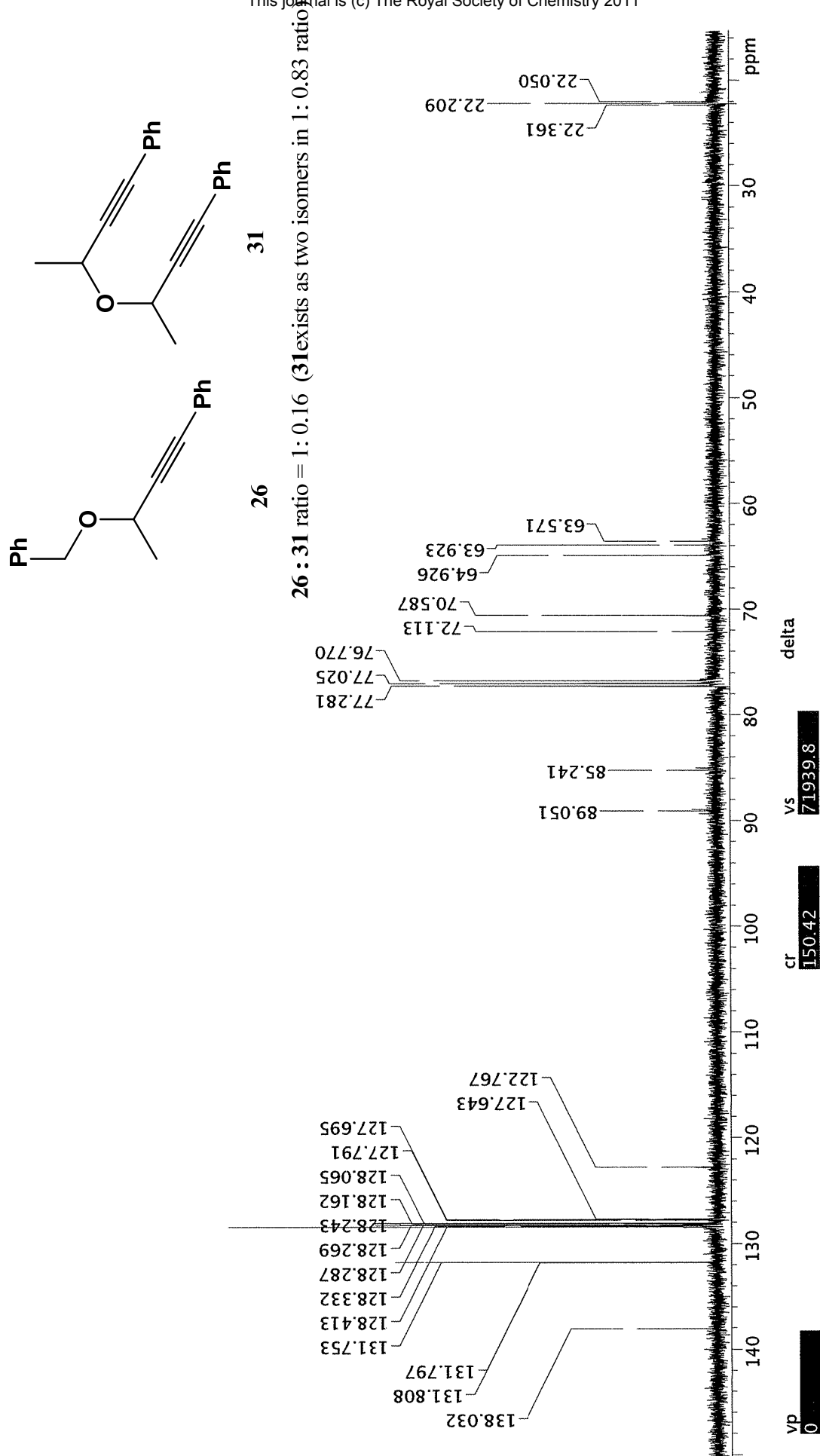


Figure 18. <sup>13</sup>C NMR of compound 26

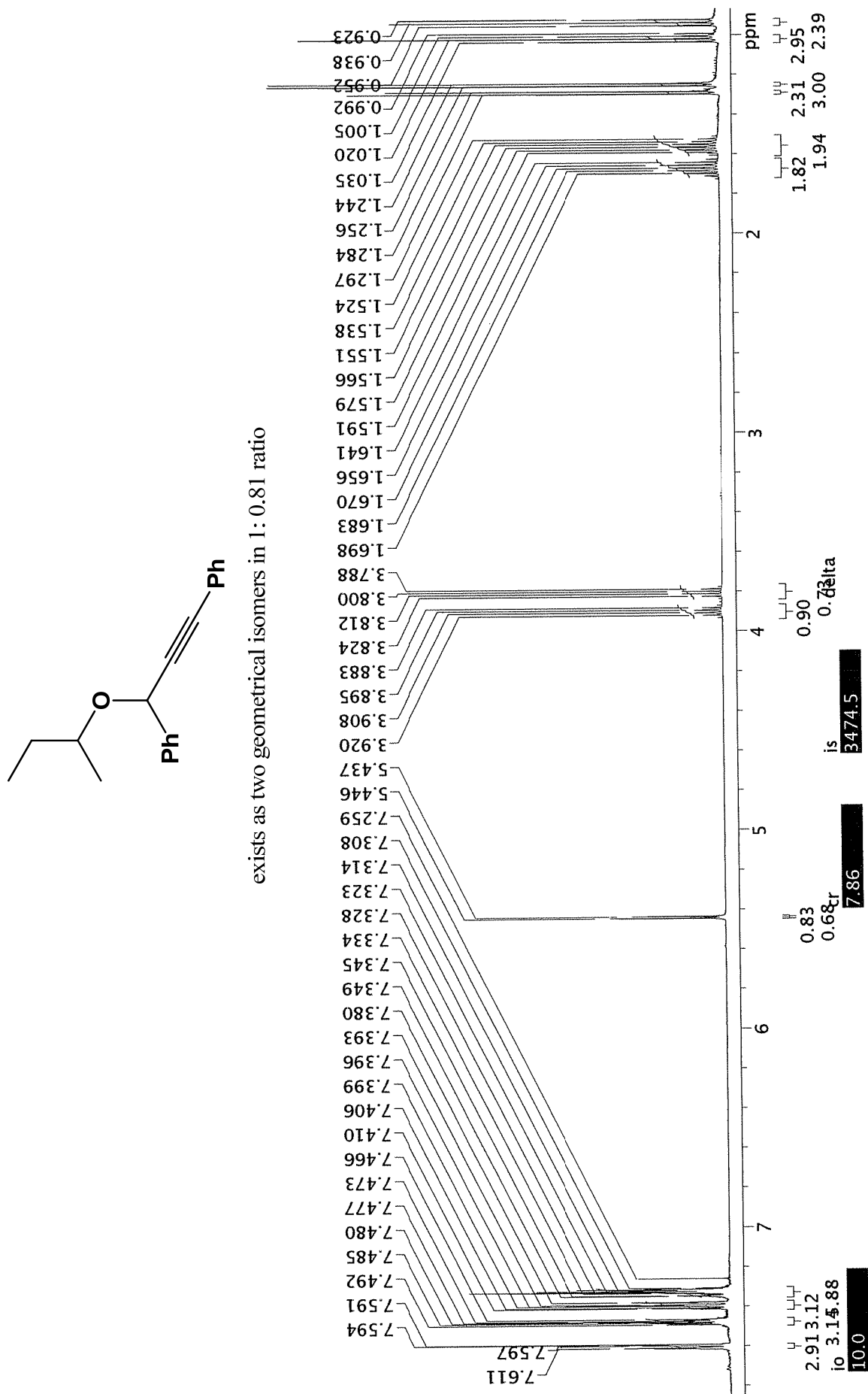
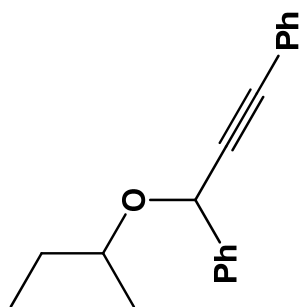


Figure 19. <sup>1</sup>H NMR of compound 29



exists as two geometrical isomers in 1:0.81 ratio

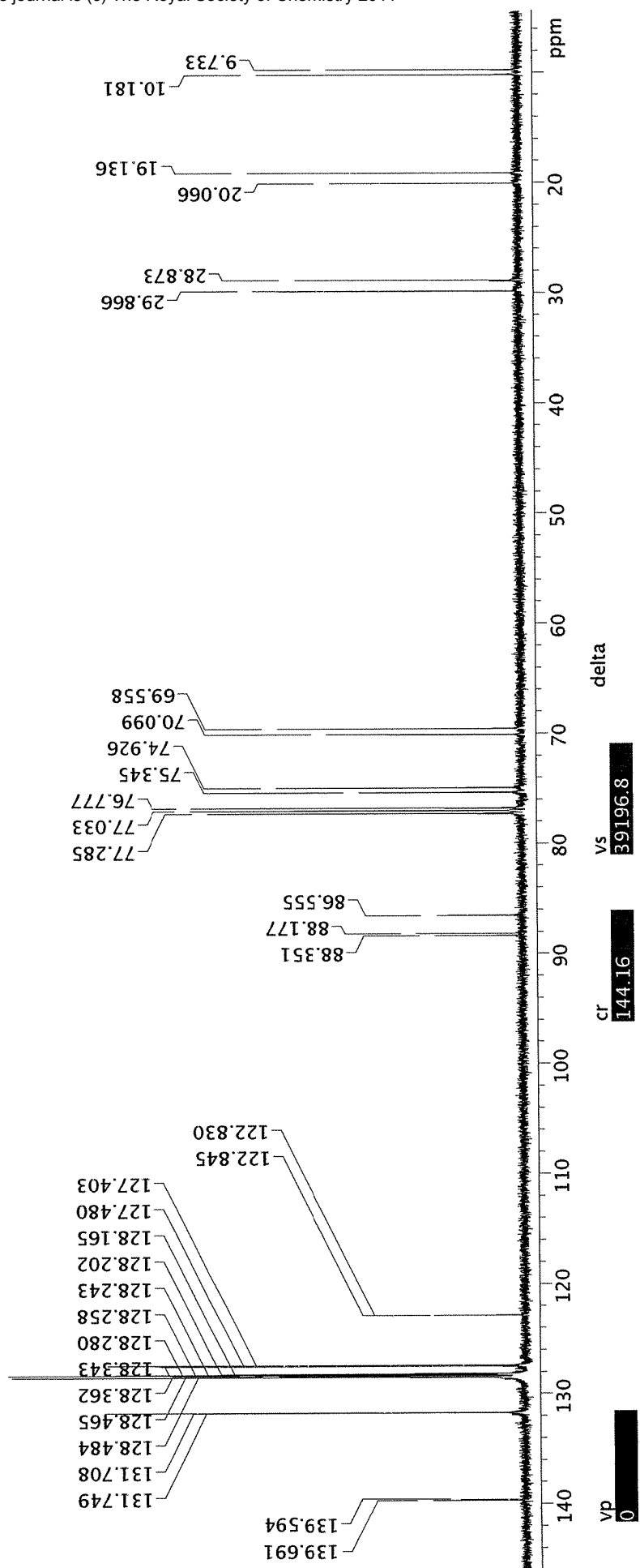


Figure 20. <sup>13</sup>C NMR of compound 29

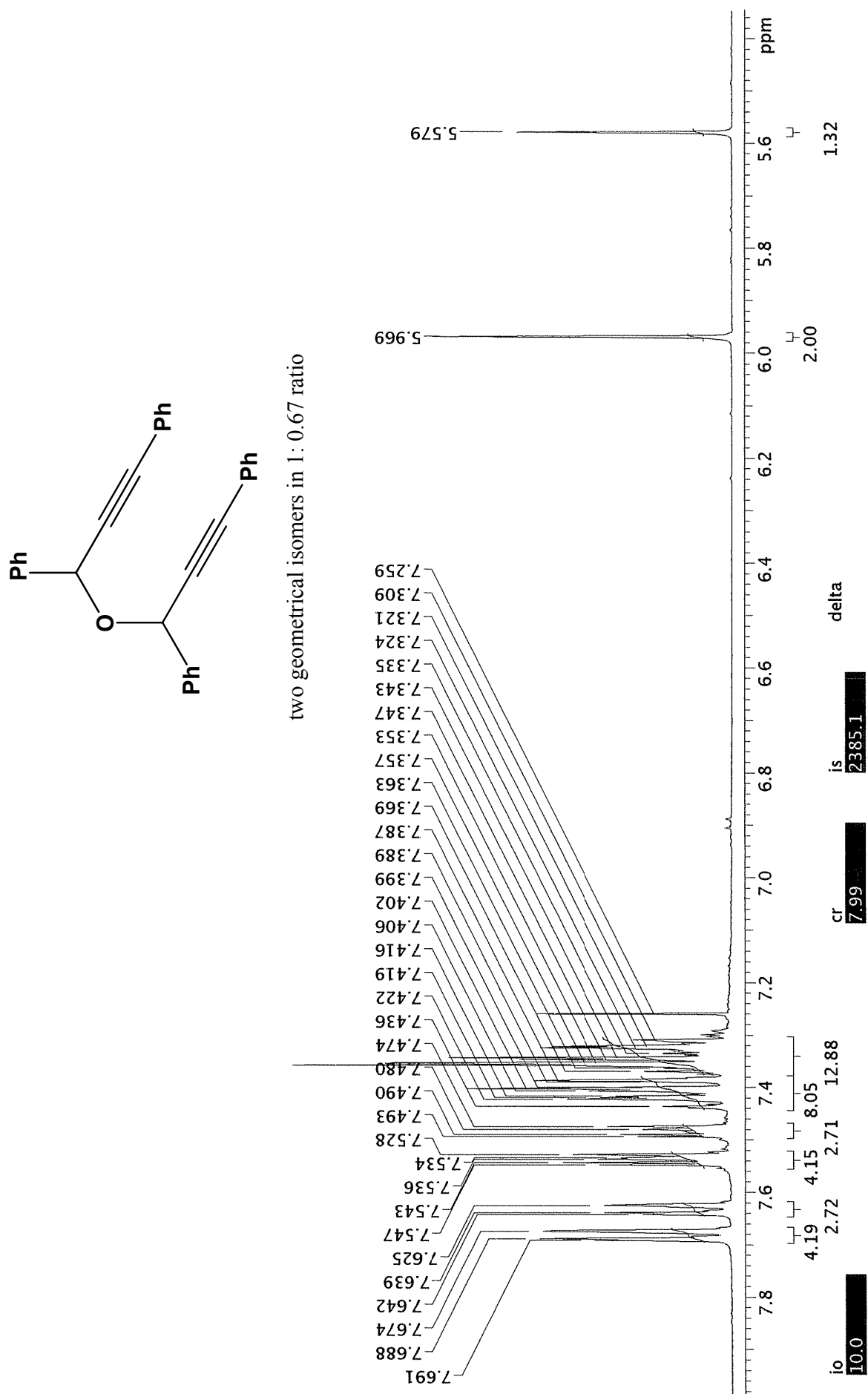


Figure 21.  $^1\text{H}$  NMR of compound 30

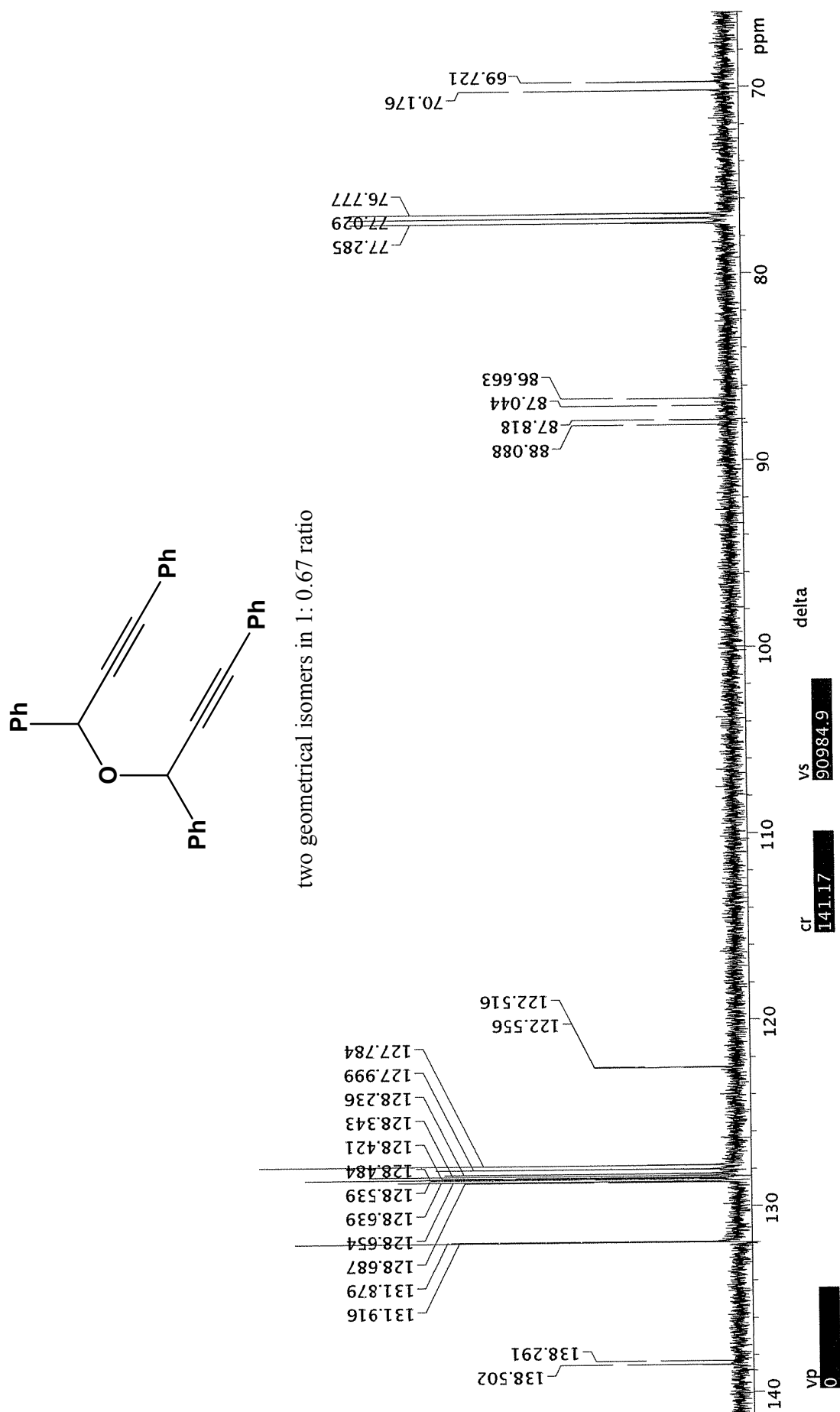


Figure 22.  $^{13}\text{C}$  NMR of compound 30

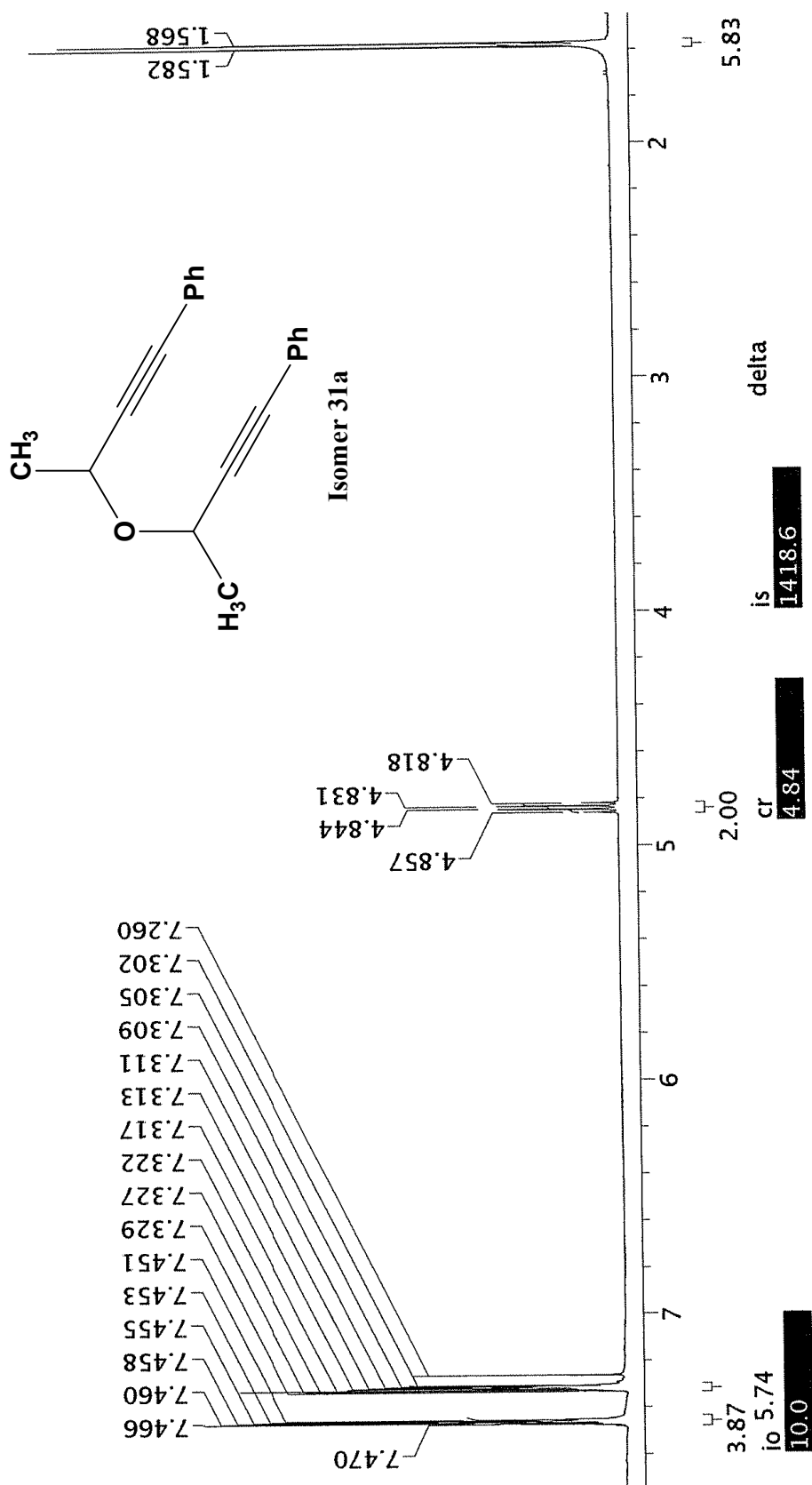


Figure 23. <sup>1</sup>H NMR of compound 31a



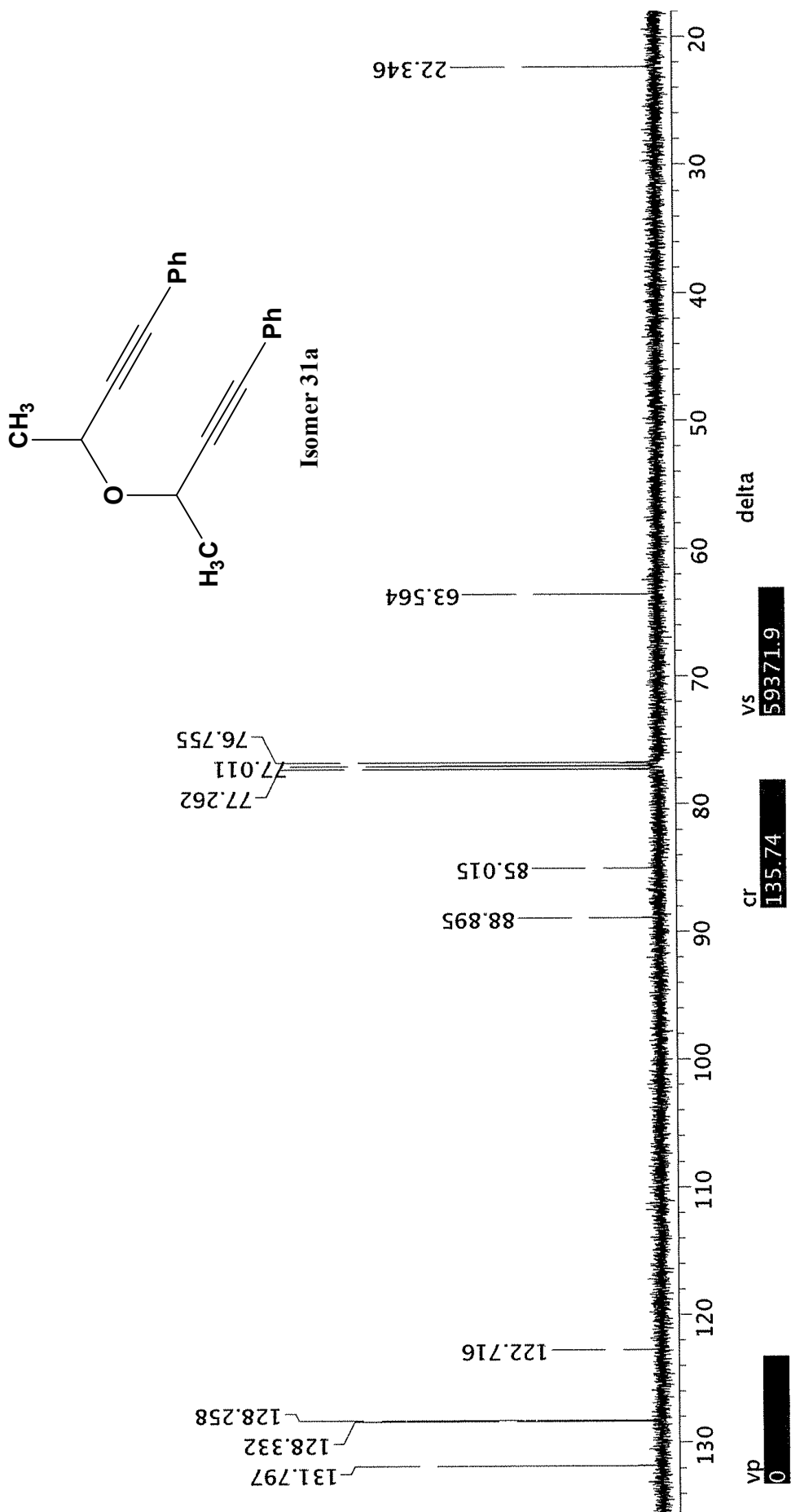


Figure 24.  $^{13}\text{C}$  NMR of compound 31a

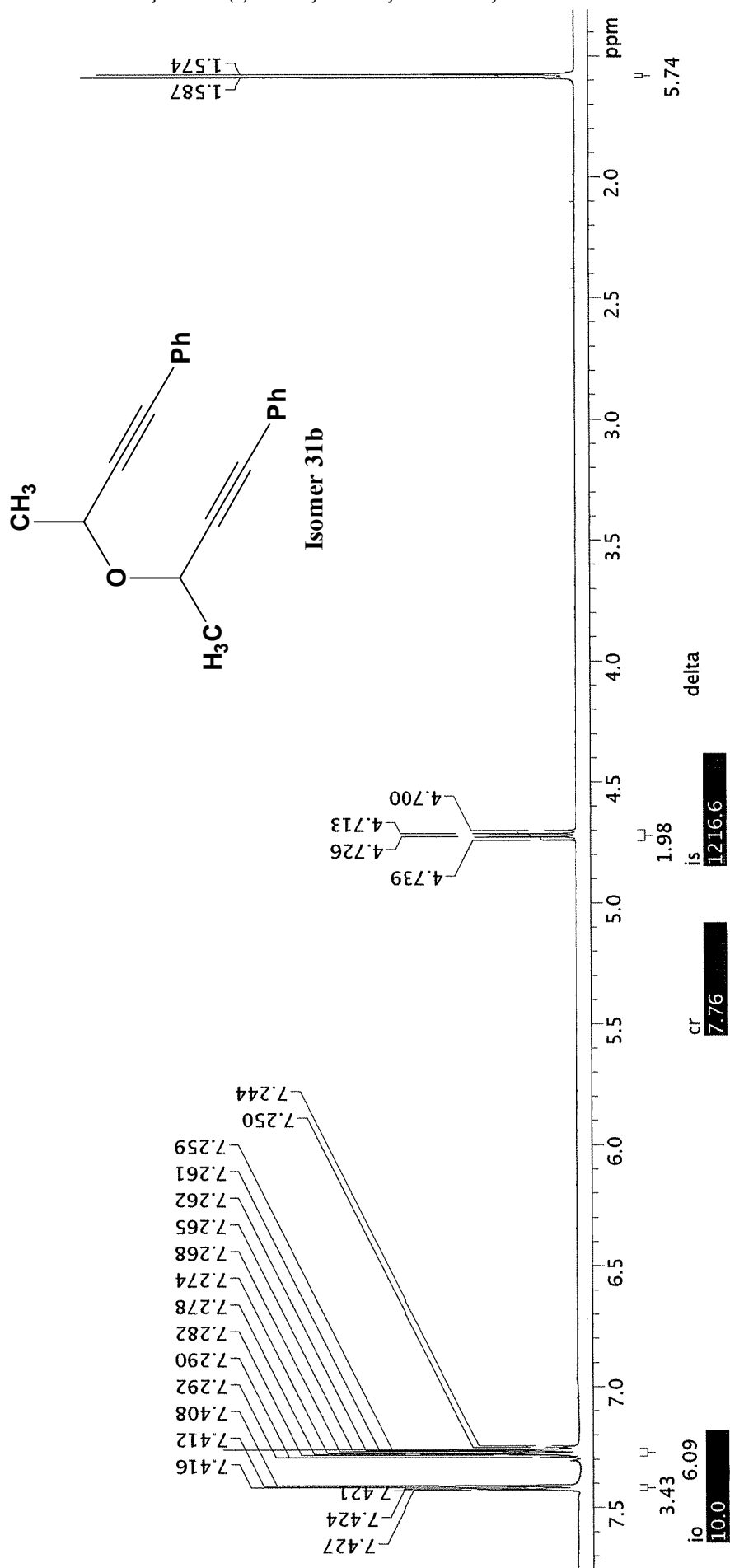
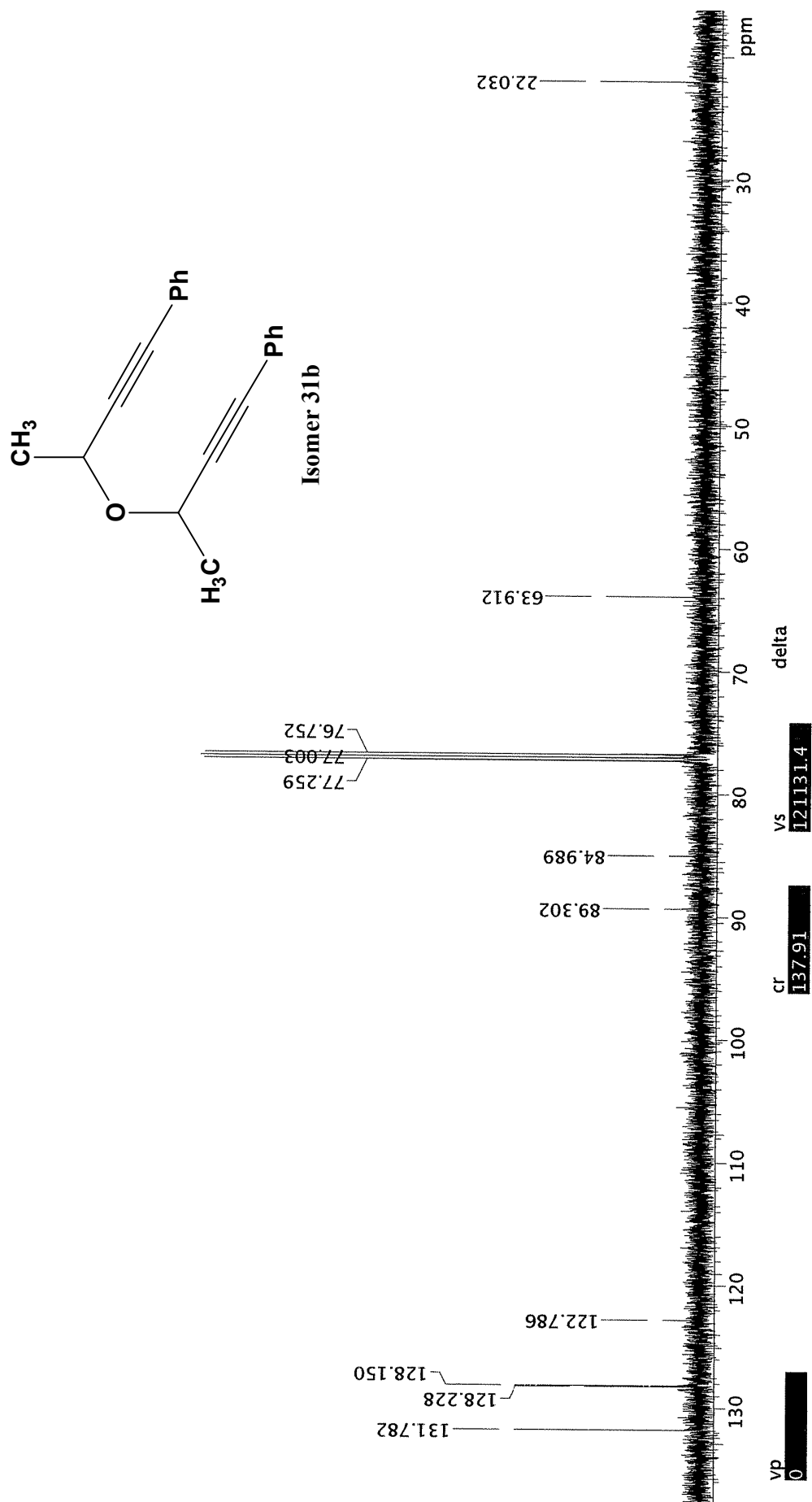
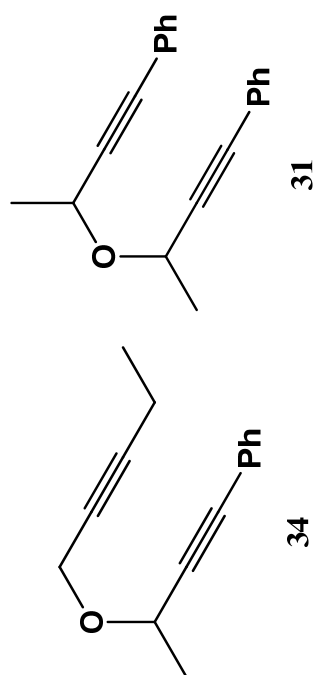


Figure 25.  $^1\text{H}$  NMR of compound 31b



**Figure 26.**  $^{13}\text{C}$  NMR of compound 31b



34: 31 ratio = 1: 0.31 (31 exists as two isomers in 1: 0.81 ratio)

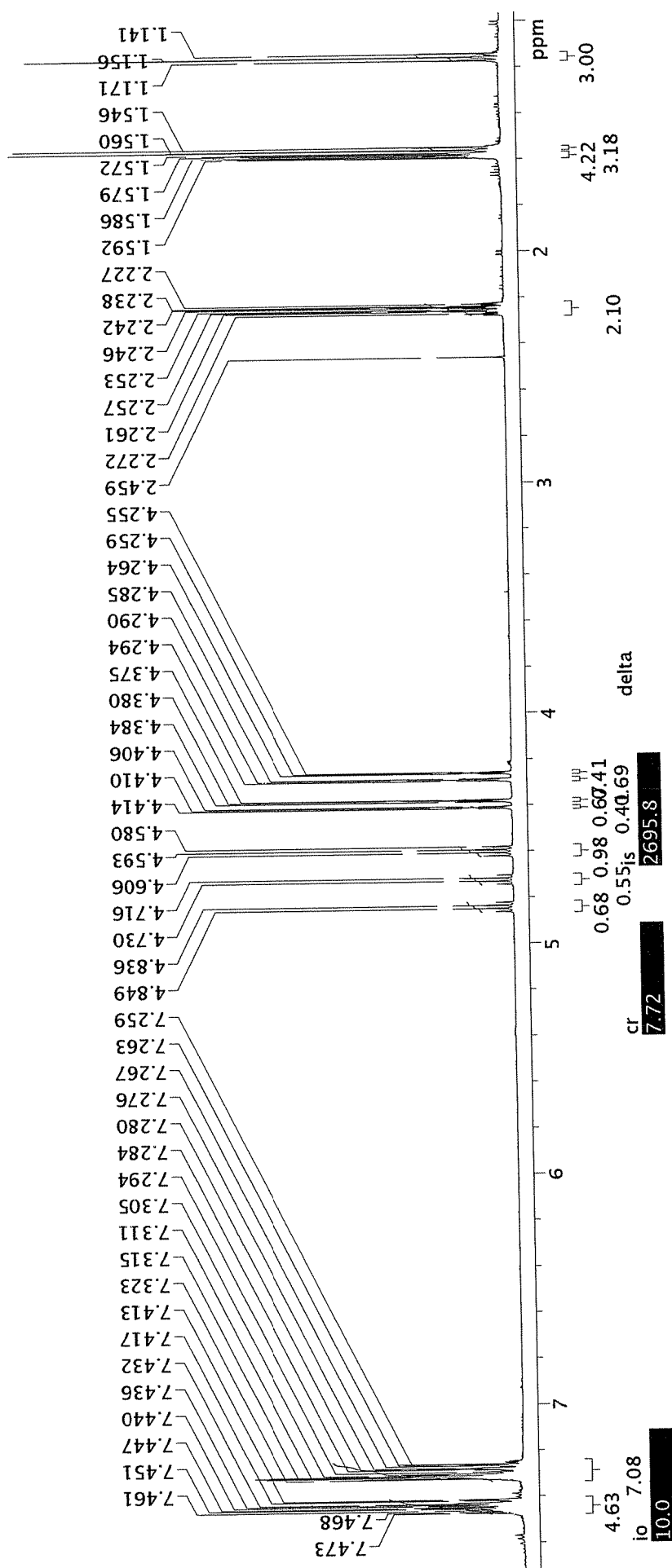
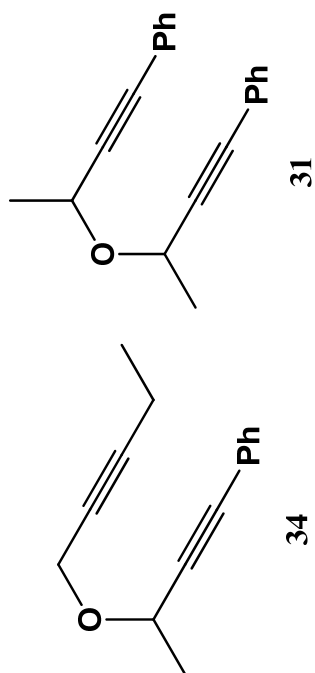


Figure 27. <sup>1</sup>H NMR of compound 34



34: 31 ratio = 1: 0.31 (31 exists as two isomers in 1: 0.81 ratio)

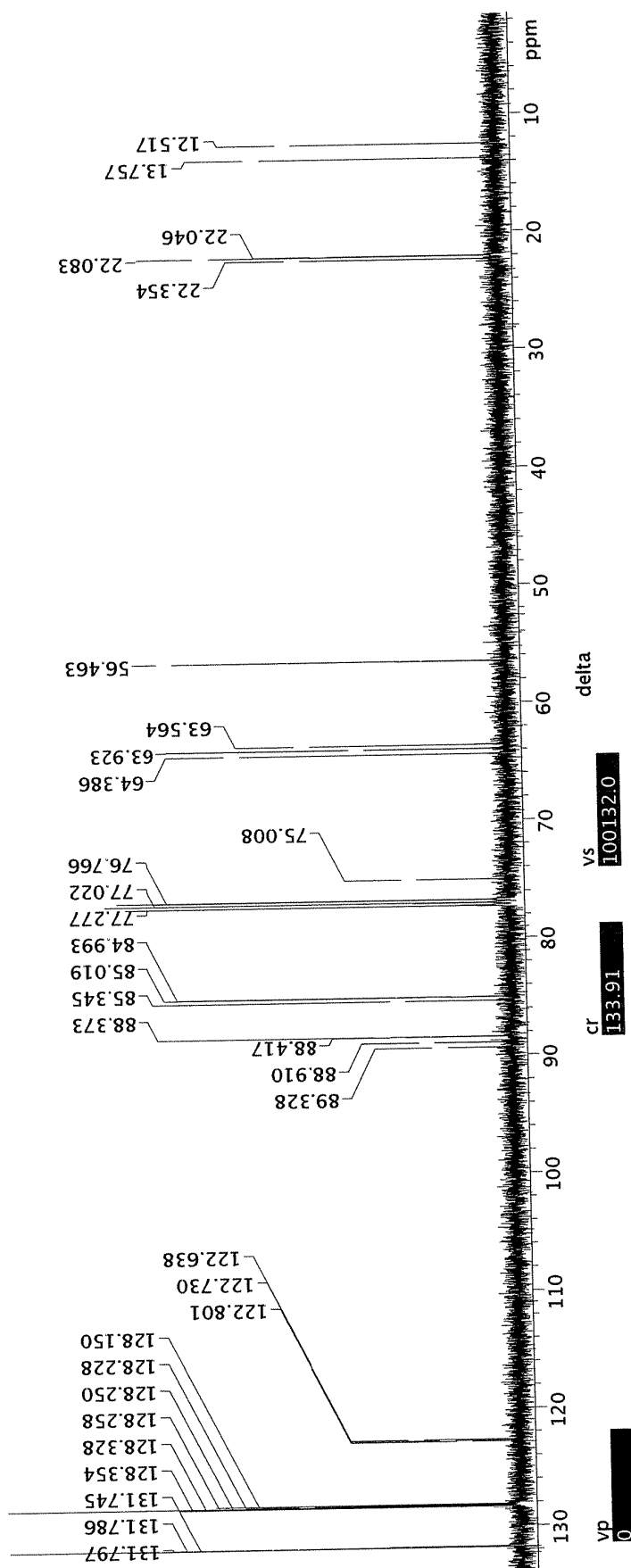


Figure 28. <sup>13</sup>C NMR of compound 34

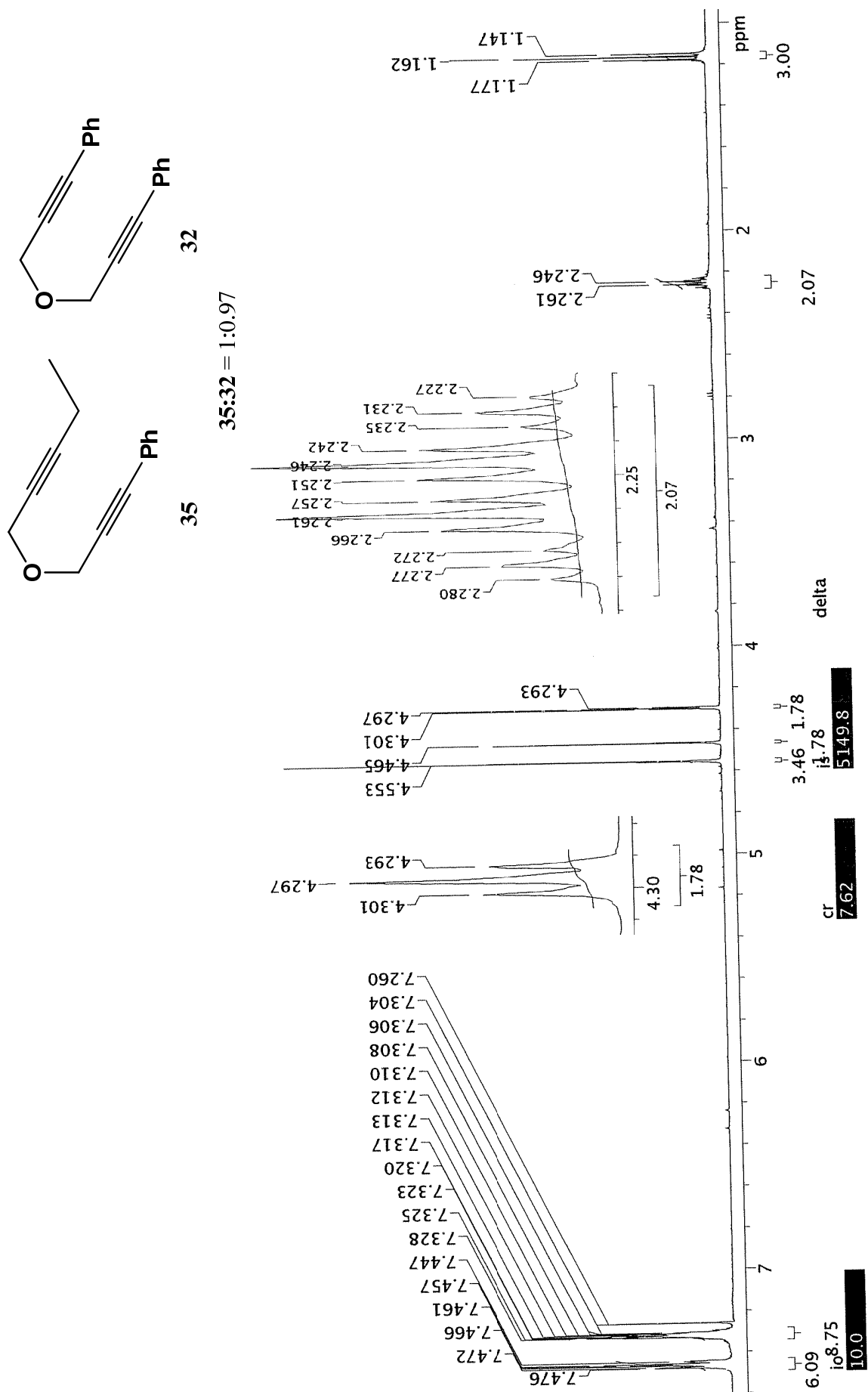


Figure 29. <sup>1</sup>H NMR of compound 35

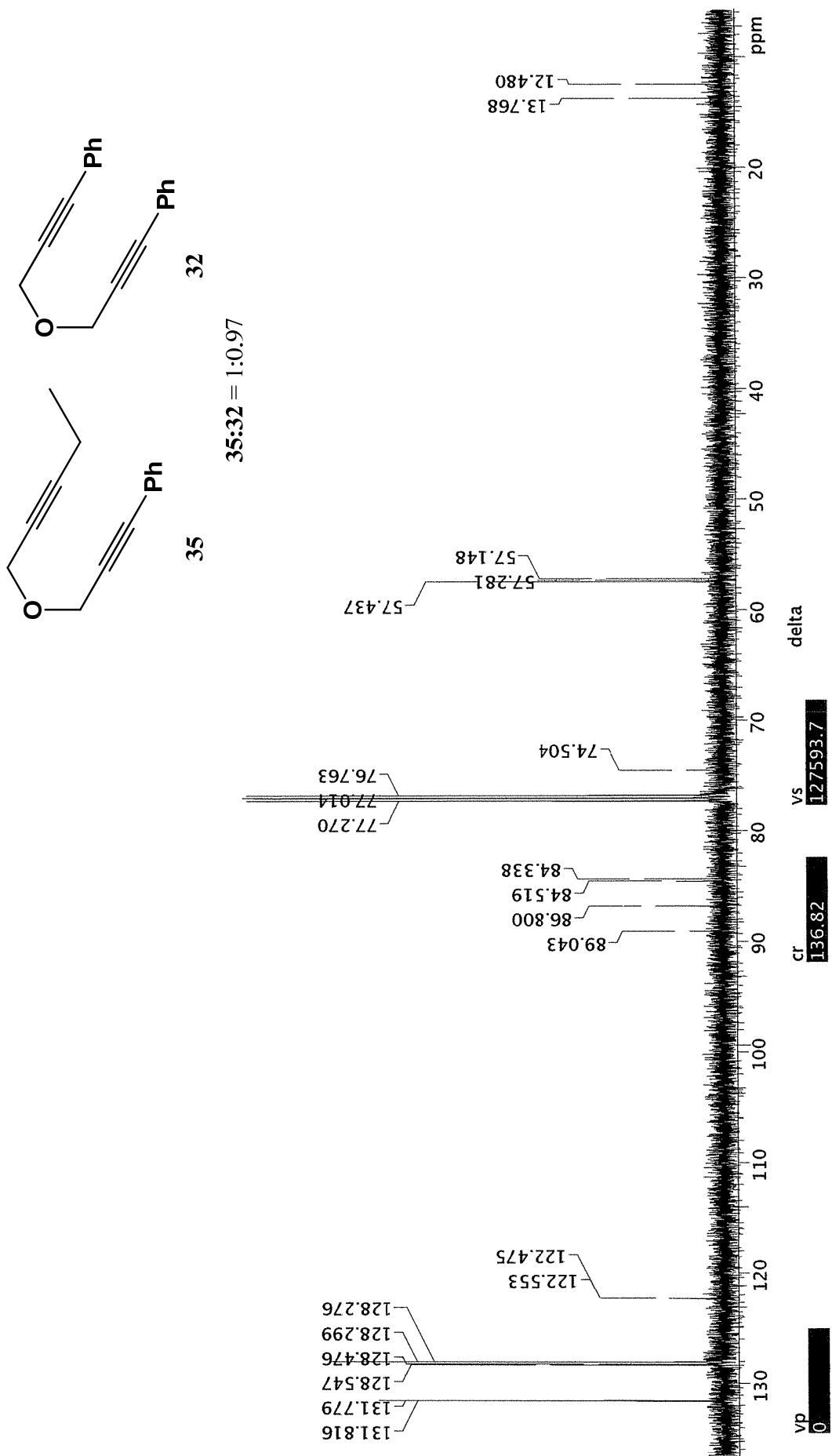


Figure 30.  $^{13}\text{C}$  NMR of compound 35

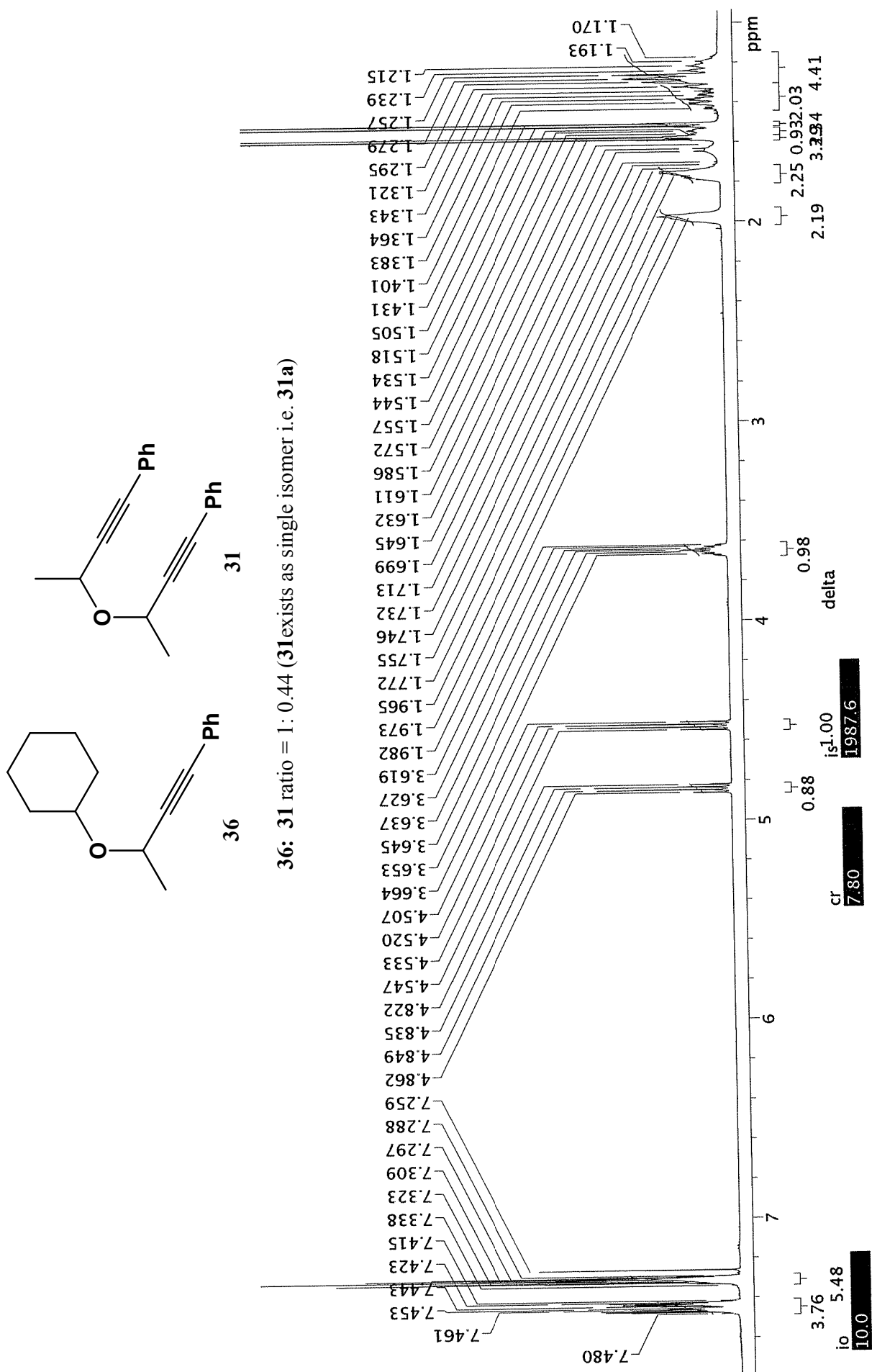
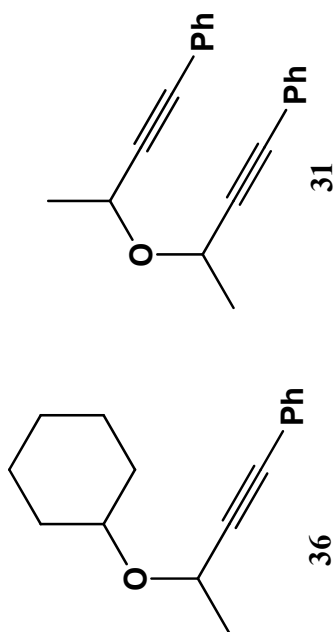




Figure 31. <sup>1</sup>H NMR of compound 36



36: 31 ratio = 1 : 0.44 (31 exists as single isomer i.e. 31a)

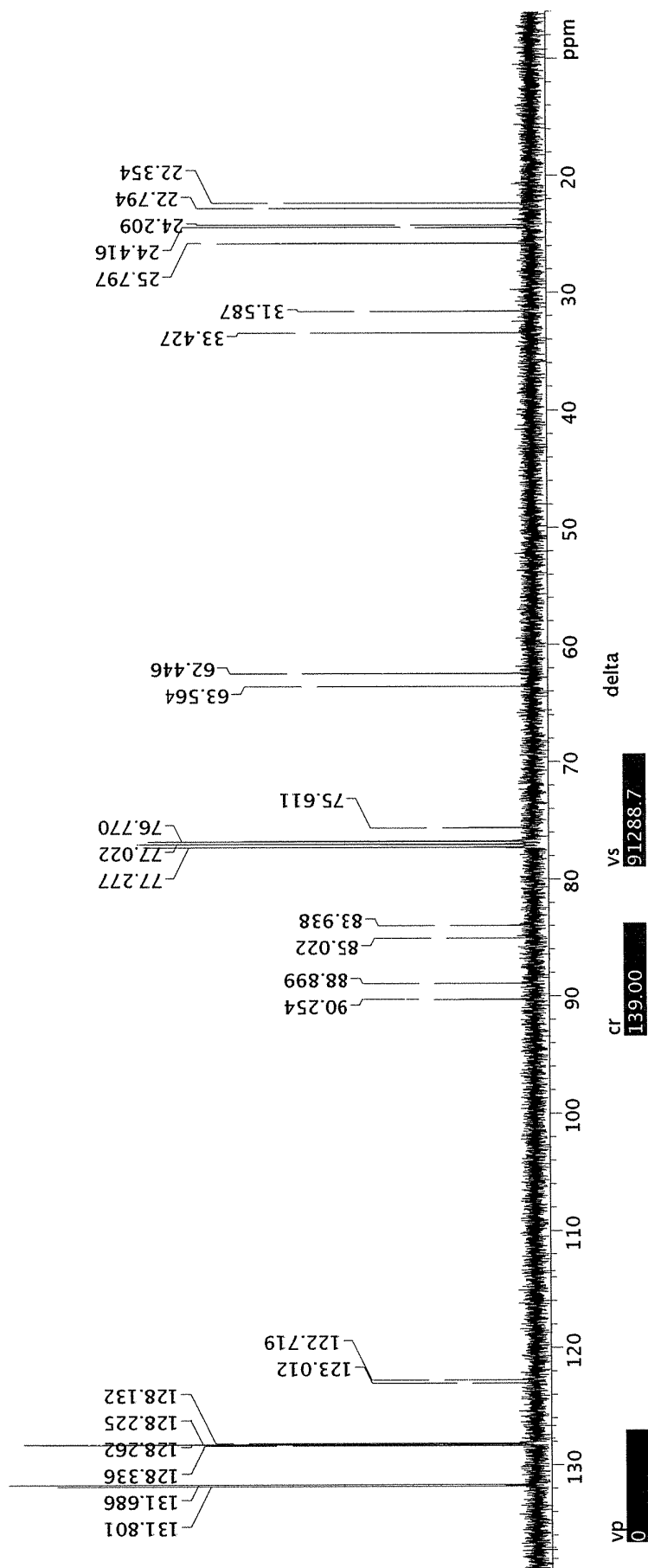


Figure 32. <sup>13</sup>C NMR of compound 36