

# Novel Soloxolone Amides as Potent Anti-Glioblastoma Candidates: Design, Synthesis, In Silico Analysis and Biological Activities In Vitro and In Vivo

Andrey V. Markov <sup>1,\*</sup>, Anna A. Ilyina <sup>1,2</sup>, Oksana V. Salomatina <sup>1,3</sup>, Aleksandra V. Sen'kova <sup>1</sup>, Alina A. Okhina <sup>2,3</sup>, Artem D. Rogachev <sup>2,3</sup>, Nariman F. Salakhutdinov <sup>3</sup> and Marina A. Zenkova <sup>1</sup>

<sup>1</sup> Institute of Chemical Biology and Fundamental Medicine, Siberian Branch of the Russian Academy of Sciences, 630090 Novosibirsk, Russia; a.ilina8@ngsu.ru (A.A.I.); ana@nioch.nsc.ru (O.V.S.); senkova\_av@nioch.nsc.ru (A.V.S.); marzen@nioch.nsc.ru (M.A.Z.)

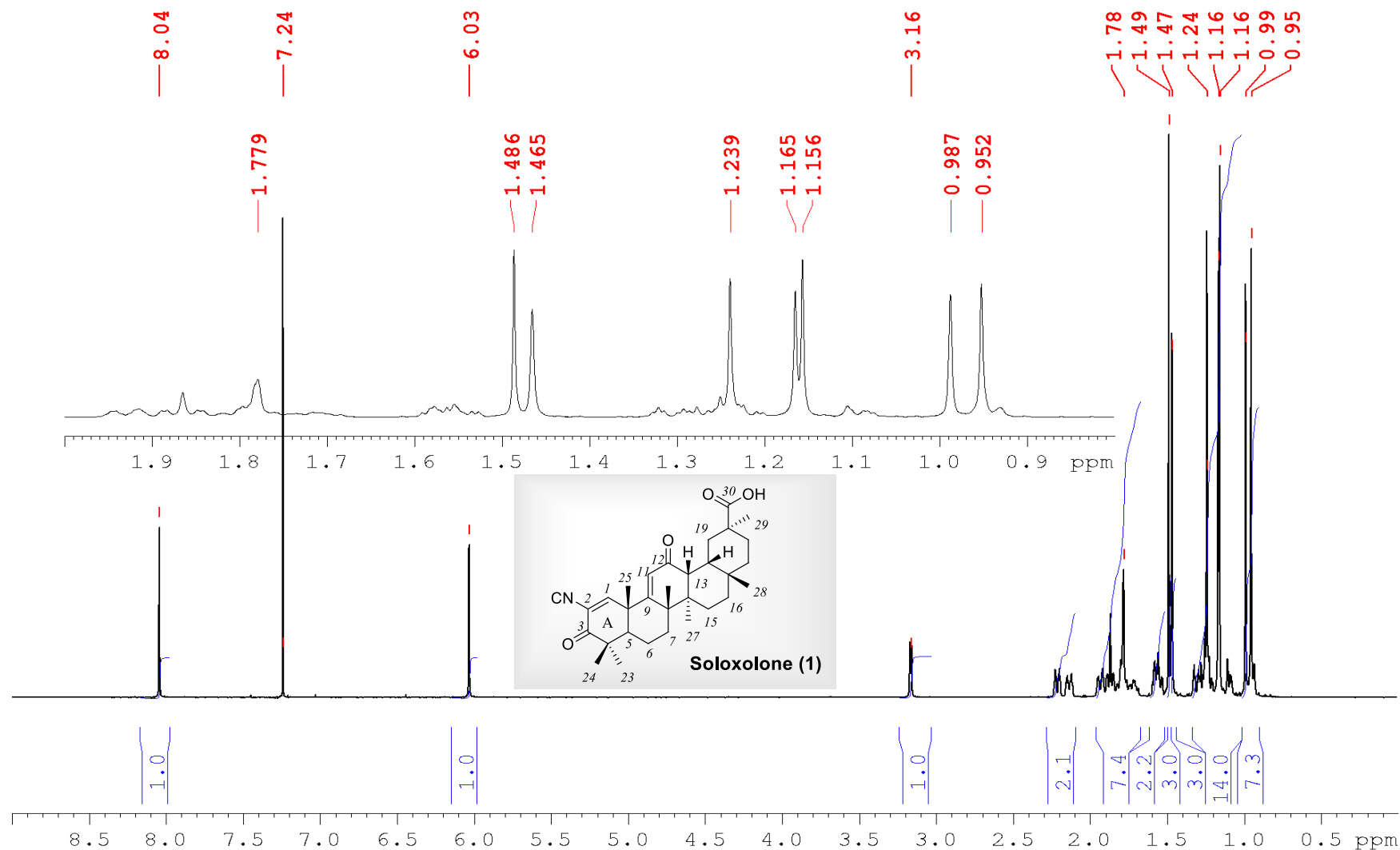
<sup>2</sup> Faculty of Natural Sciences, Novosibirsk State University, 630090 Novosibirsk, Russia; aokhina@nioch.nsc.ru (A.A.O.); rogachev@nioch.nsc.ru (A.D.R.)

<sup>3</sup> N.N. Vorozhtsov Novosibirsk Institute of Organic Chemistry, Siberian Branch of the Russian Academy of Sciences, 630090 Novosibirsk, Russia; anvar@nioch.nsc.ru

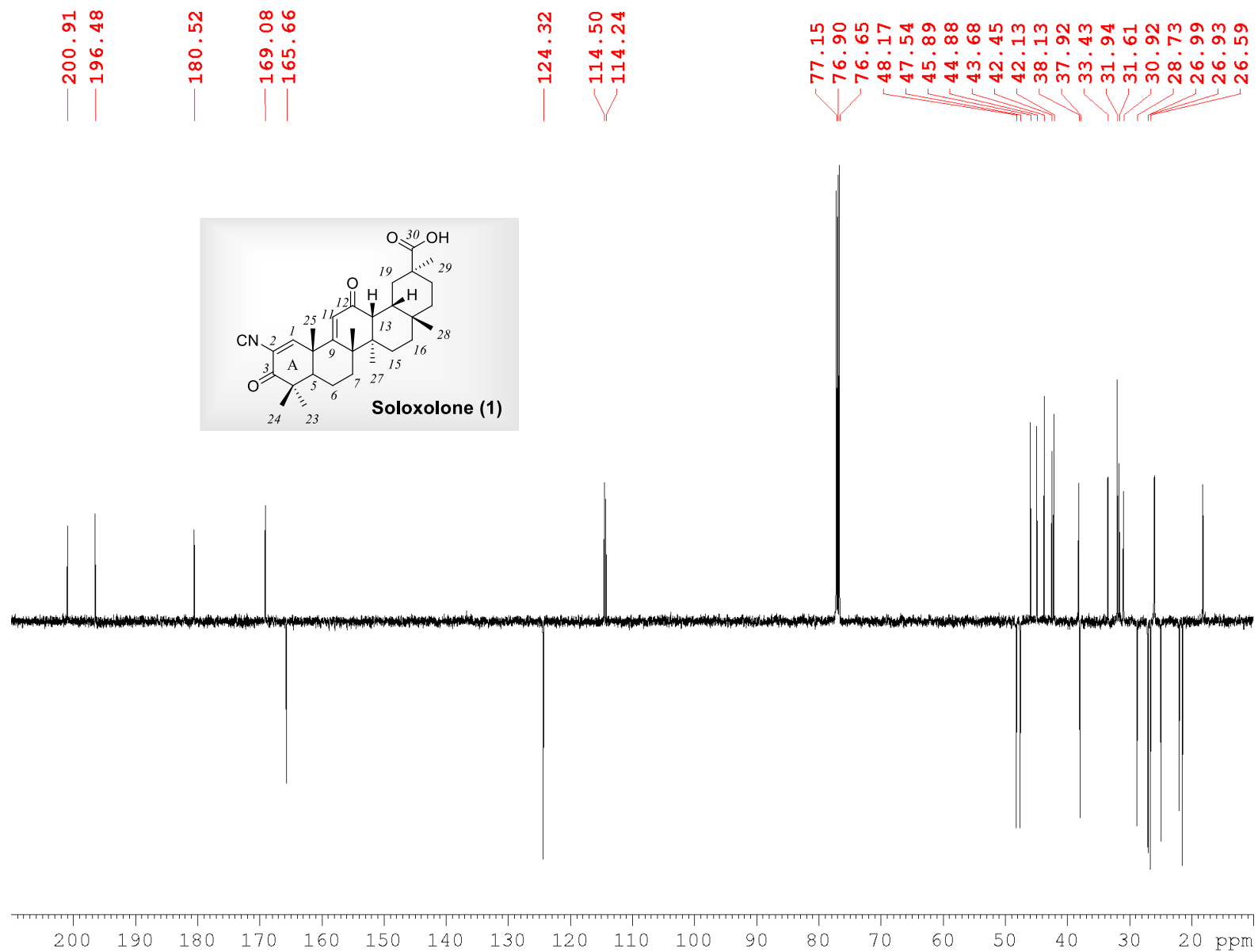
\* Correspondence: andmrkv@gmail.com; Tel.: +7-383-363-51-61

**Supplementary File 1.** NMR Spectrum of synthesized compounds

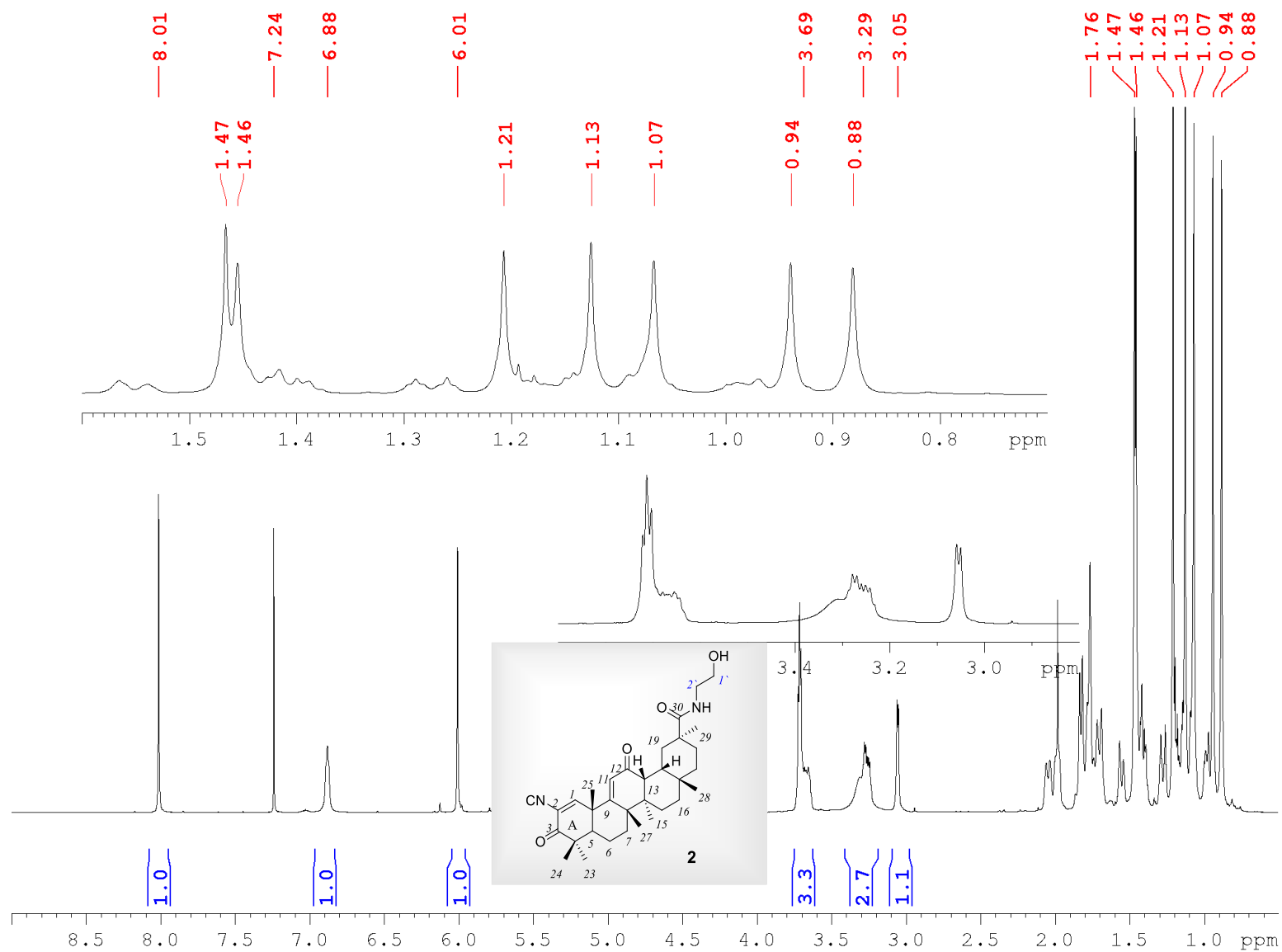
Spectrum of Soloxolone **1**,  $^1\text{H}$  NMR, 500MHz,  $\text{CDCl}_3$



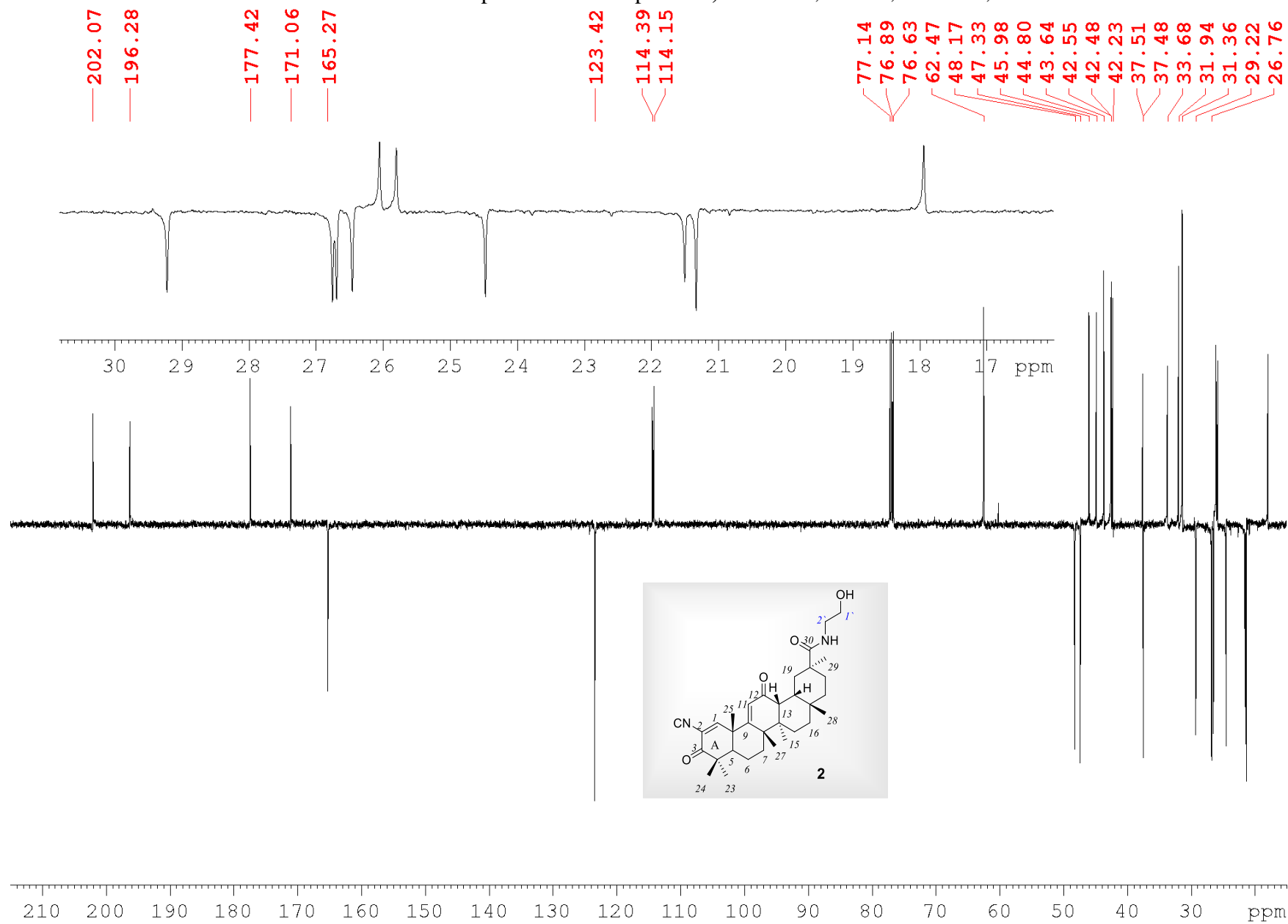
Spectrum of Soloxolone **1**,  $^{13}\text{C}$  NMR, 125MHz,  $\text{CDCl}_3$



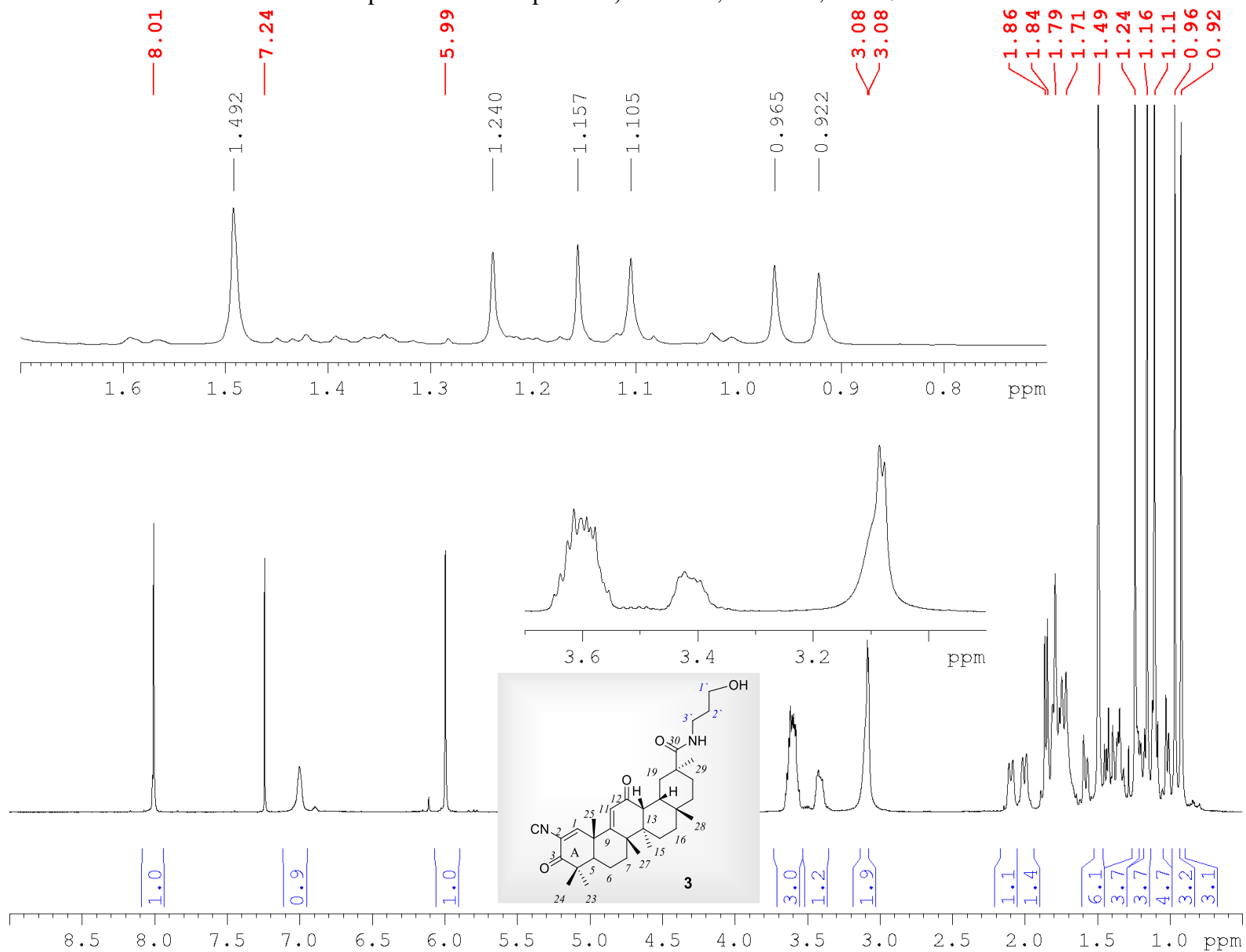
Spectrum of Compound **2**,  $^1\text{H}$  NMR, 500MHz,  $\text{CDCl}_3$



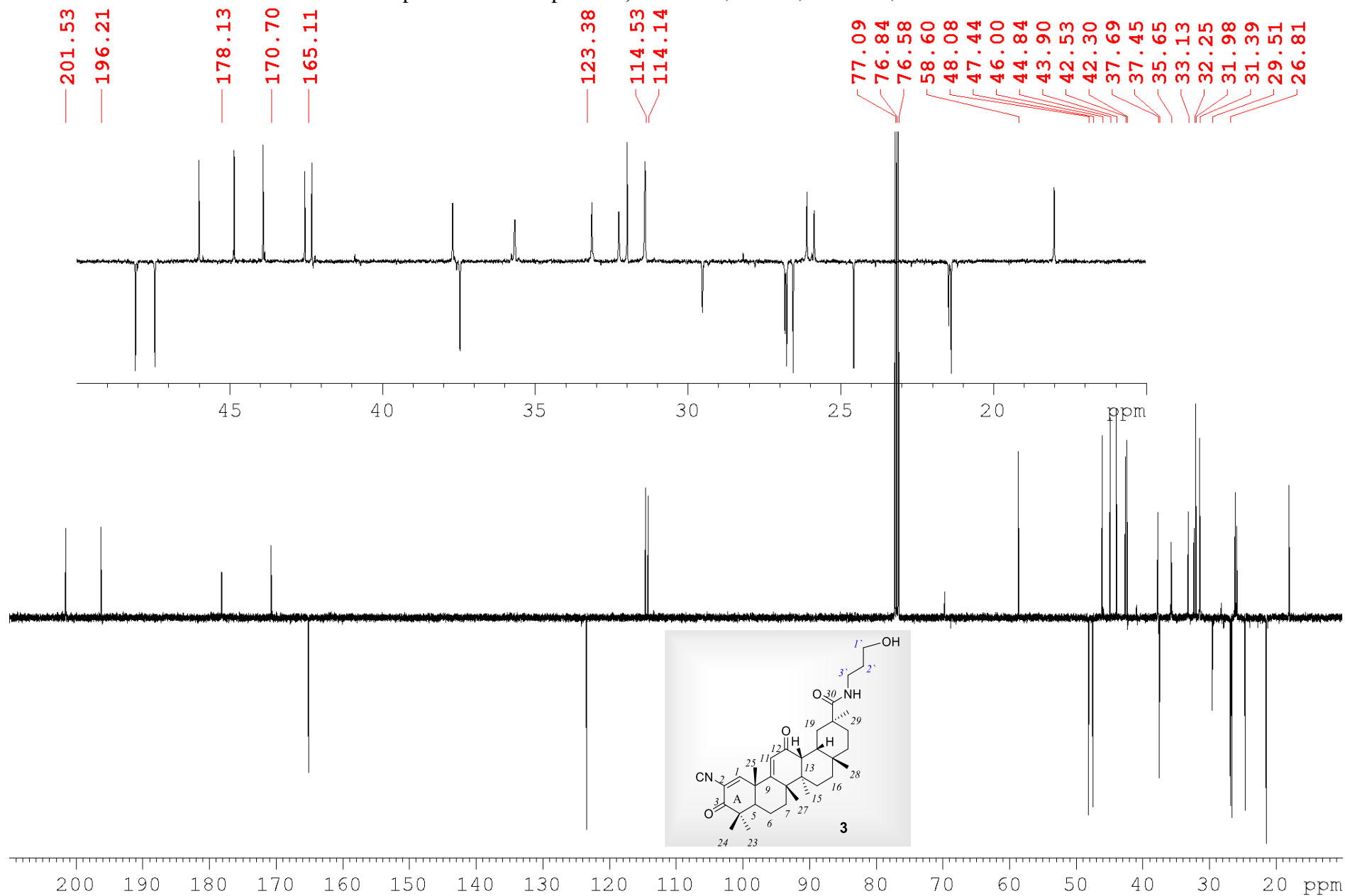
Spectrum of Compound **2**,  $^{13}\text{C}$  NMR, JMOD, 125MHz,  $\text{CDCl}_3$



Spectrum of Compound **3**,  $^1\text{H}$  NMR, 500MHz,  $\text{CDCl}_3$



Spectrum of Compound **3**,  $^{13}\text{C}$  NMR, JMOD, 125MHz,  $\text{CDCl}_3$



**<sup>1</sup>H NMR spectrum of compound 4 in CDCl<sub>3</sub>.**

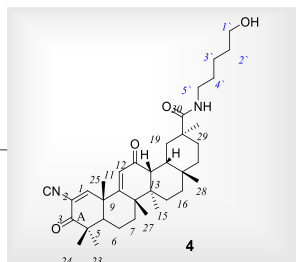
**Chemical structure of compound 4 (inset):** A complex polycyclic molecule with a nitrile group (CN) and a side chain containing a hydroxyl group (OH) and an amine group (NH). The structure is labeled with carbon numbers 1 through 29.

**Peak list (ppm):**

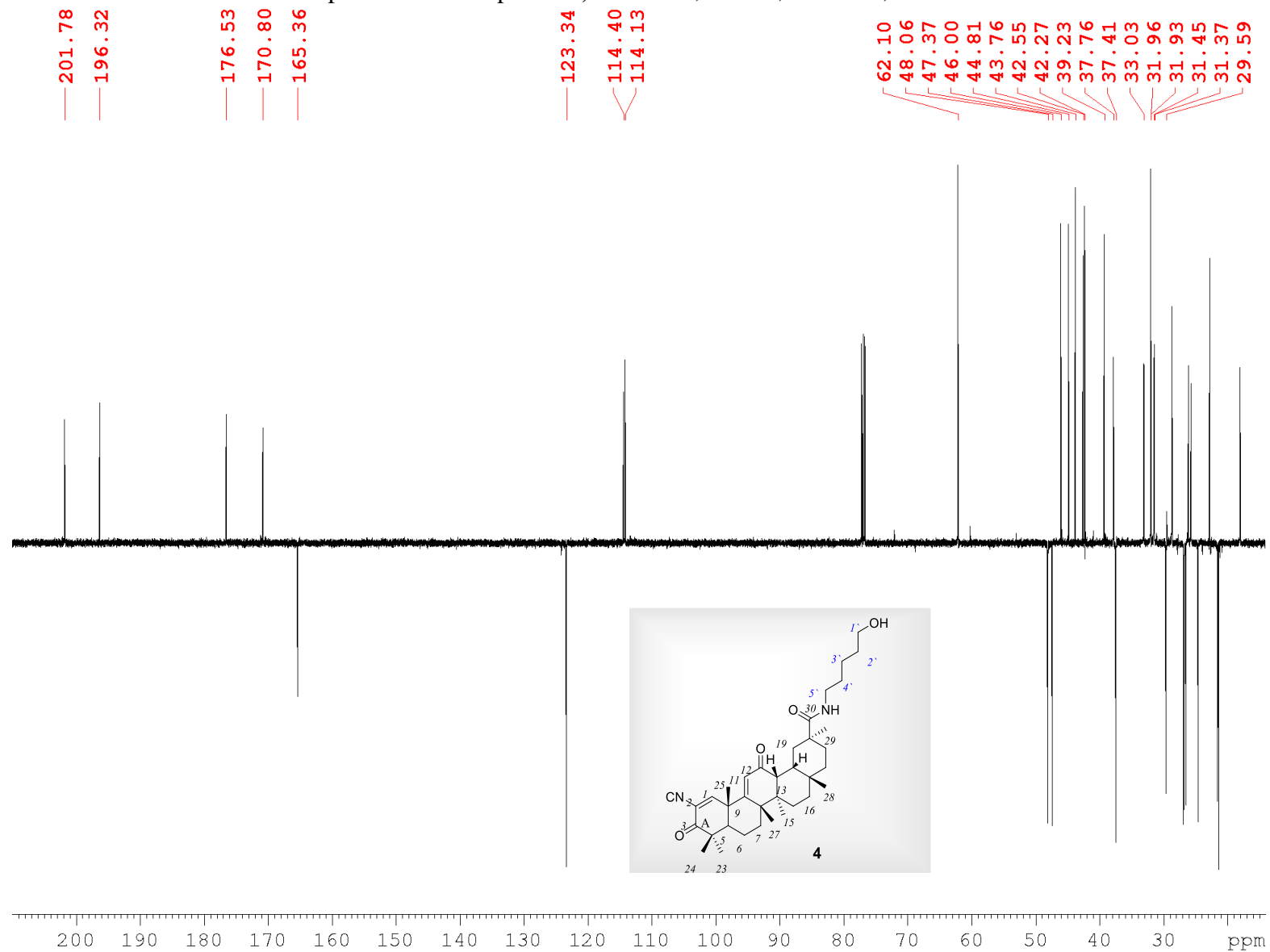
- 8.03 (1.0)
- 7.24 (1.0)
- 6.67 (1.0)
- 5.99 (1.0)
- 1.21
- 1.13
- 1.04
- 3.60 (2.2)
- 3.29 (2.3)
- 3.06 (1.2)
- 2.94 (1.6)
- 1.76 (8.6)
- 1.59 (4.3)
- 1.58 (4.5)
- 1.57 (3.5)
- 1.47 (3.9)
- 1.46 (3.6)
- 1.21
- 1.13
- 1.04
- 0.94
- 0.88

**Integration values (bottom):**

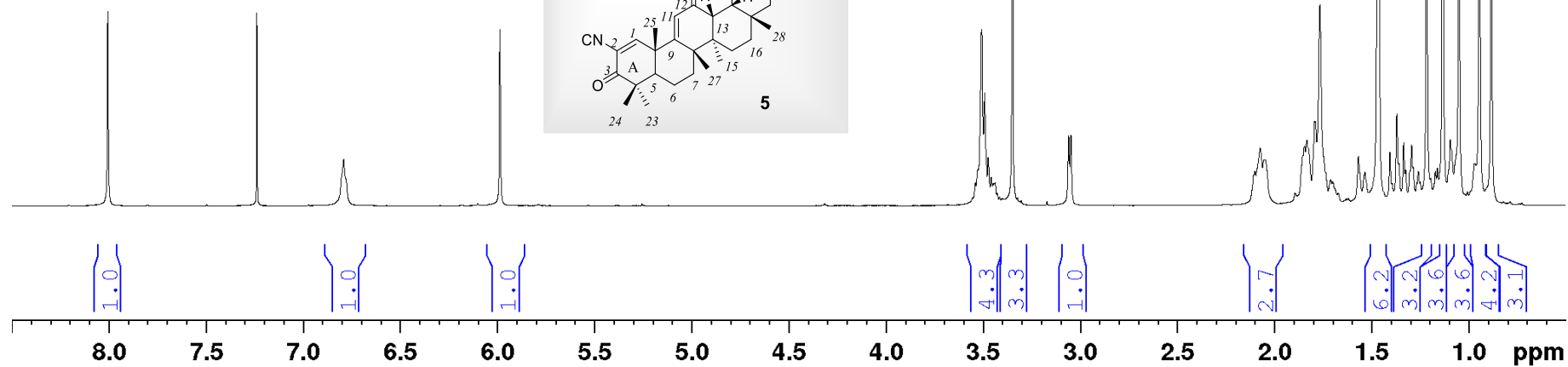
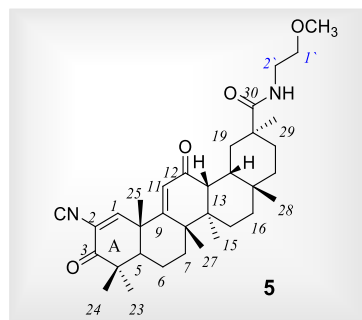
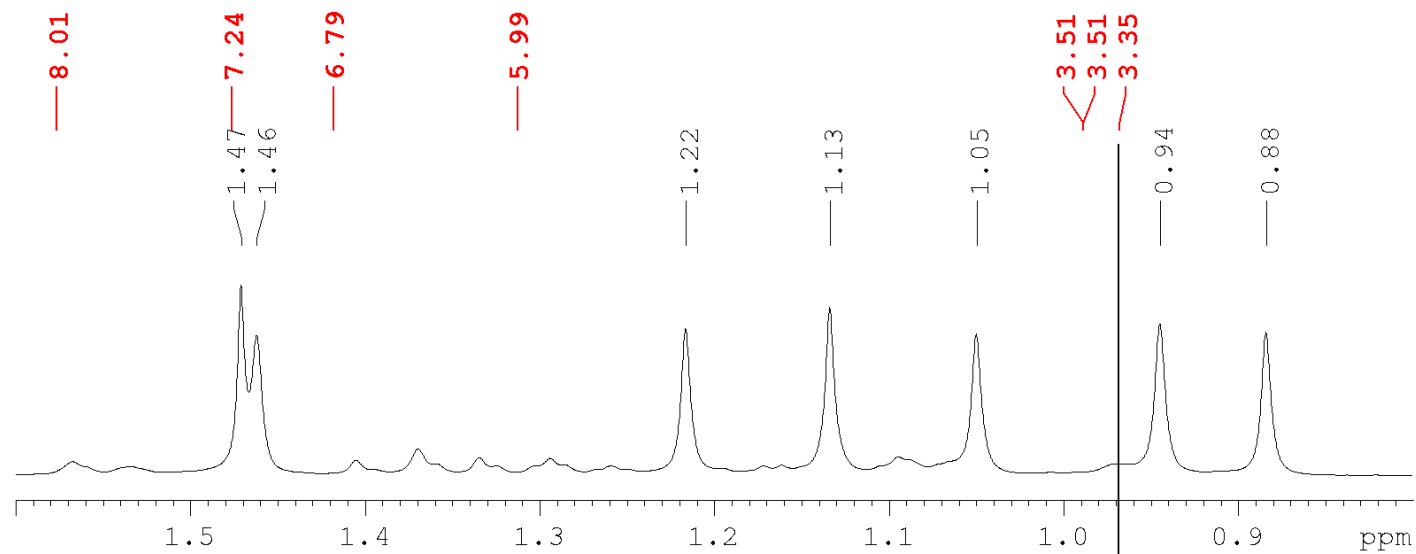
- 1.0
- 1.0
- 1.0
- 2.2
- 2.3
- 1.2
- 1.6
- 2.0
- 8.6
- 4.3
- 4.5
- 3.5
- 3.9
- 3.6



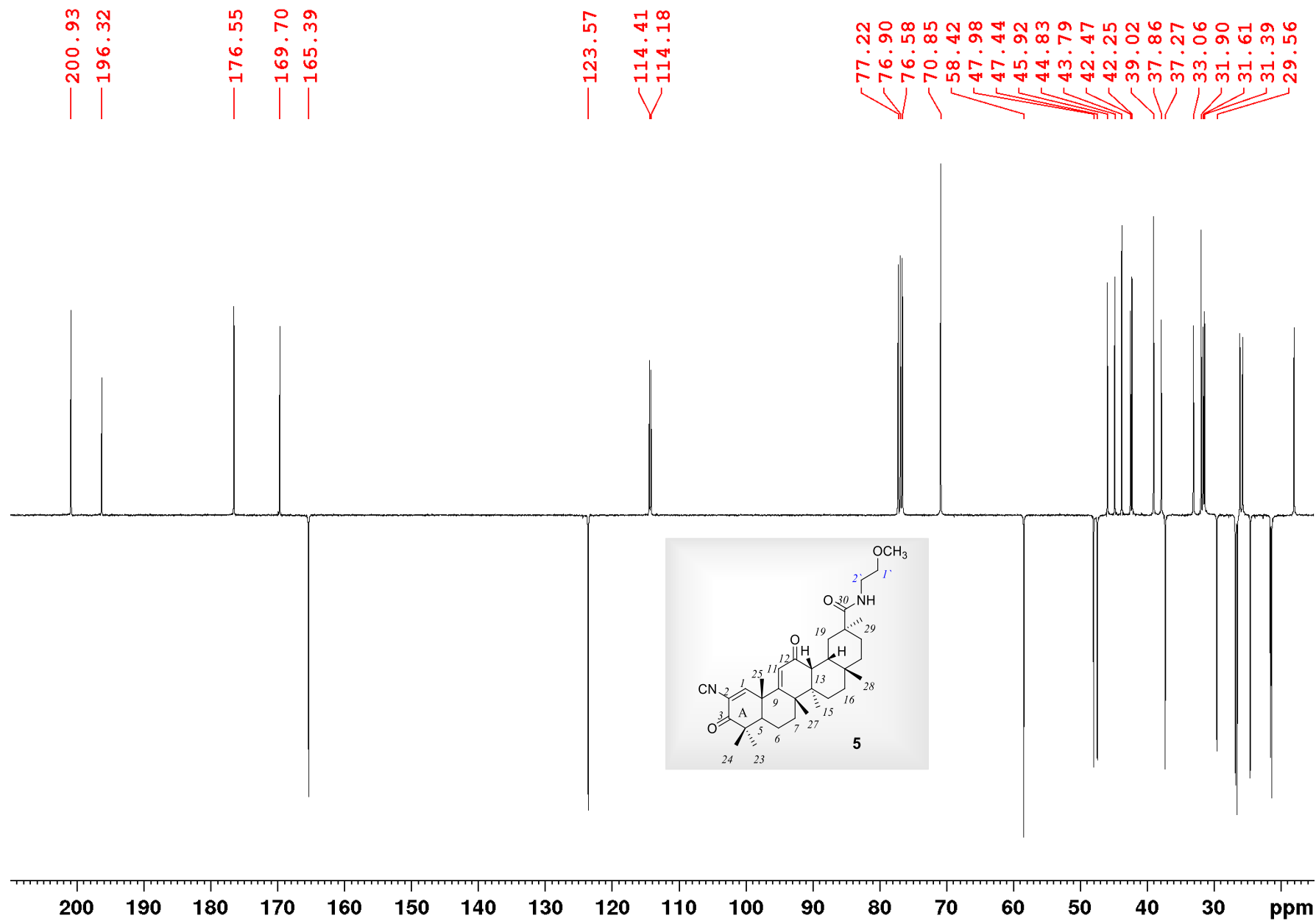
Spectrum of Compound **4**,  $^{13}\text{C}$  NMR, JMOD, 125MHz,  $\text{CDCl}_3$



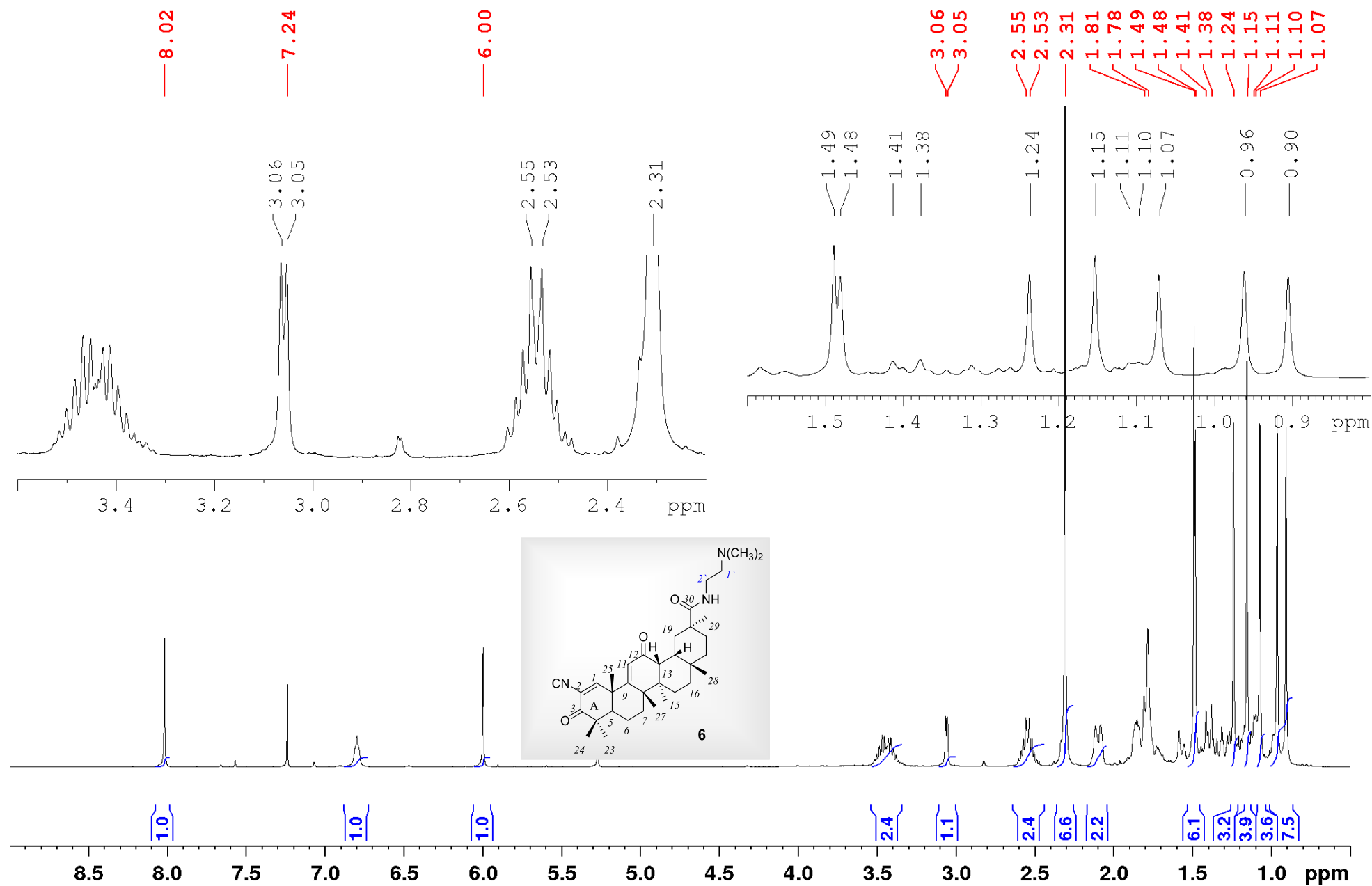
Spectrum of Compound **5**,  $^1\text{H}$  NMR, 400MHz,  $\text{CDCl}_3$



Spectrum of Compound **5**,  $^{13}\text{C}$  NMR, JMOD, 100MHz,  $\text{CDCl}_3$

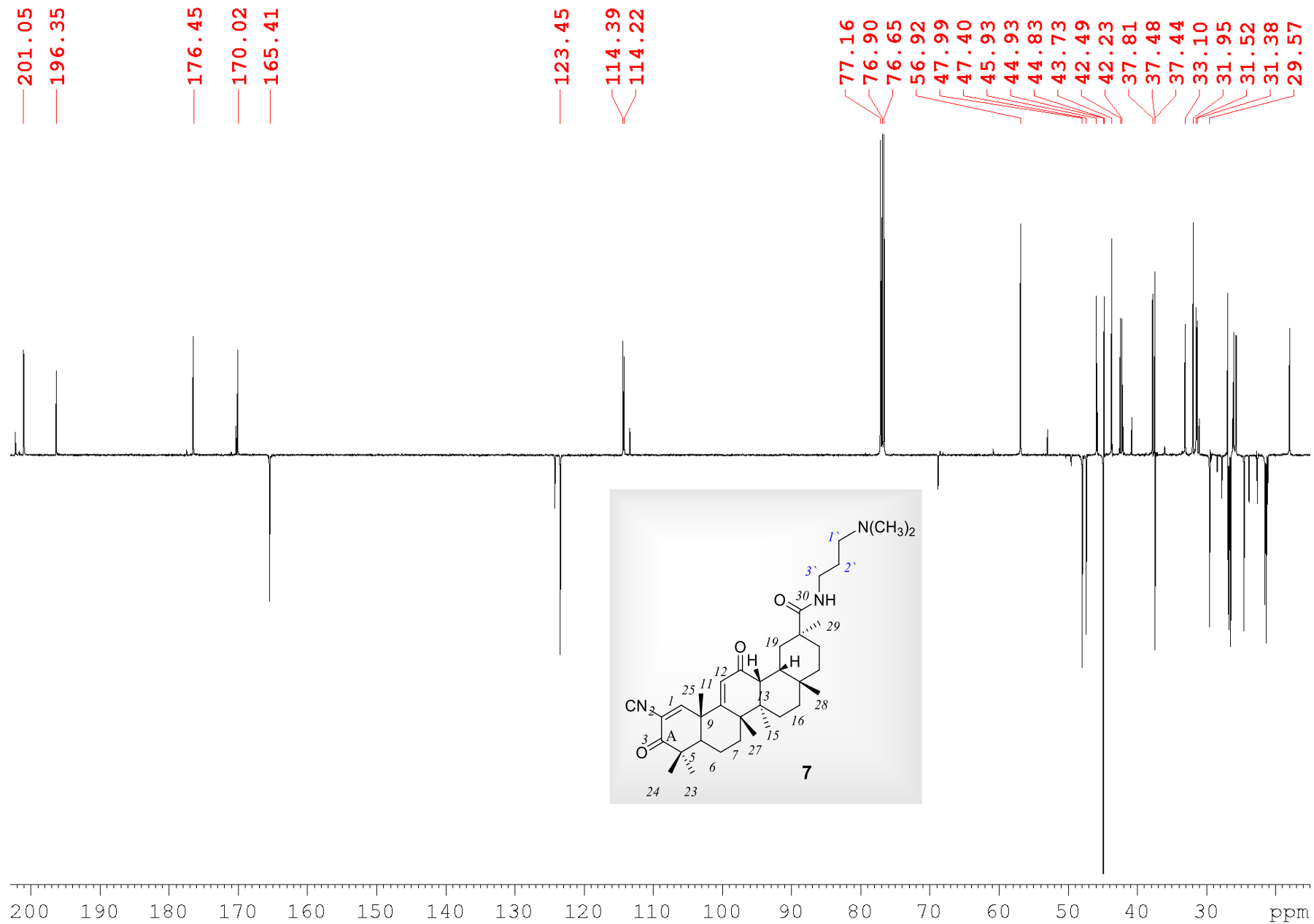


Spectrum of Compound 6, <sup>1</sup>H NMR, 400MHz, CDCl<sub>3</sub>



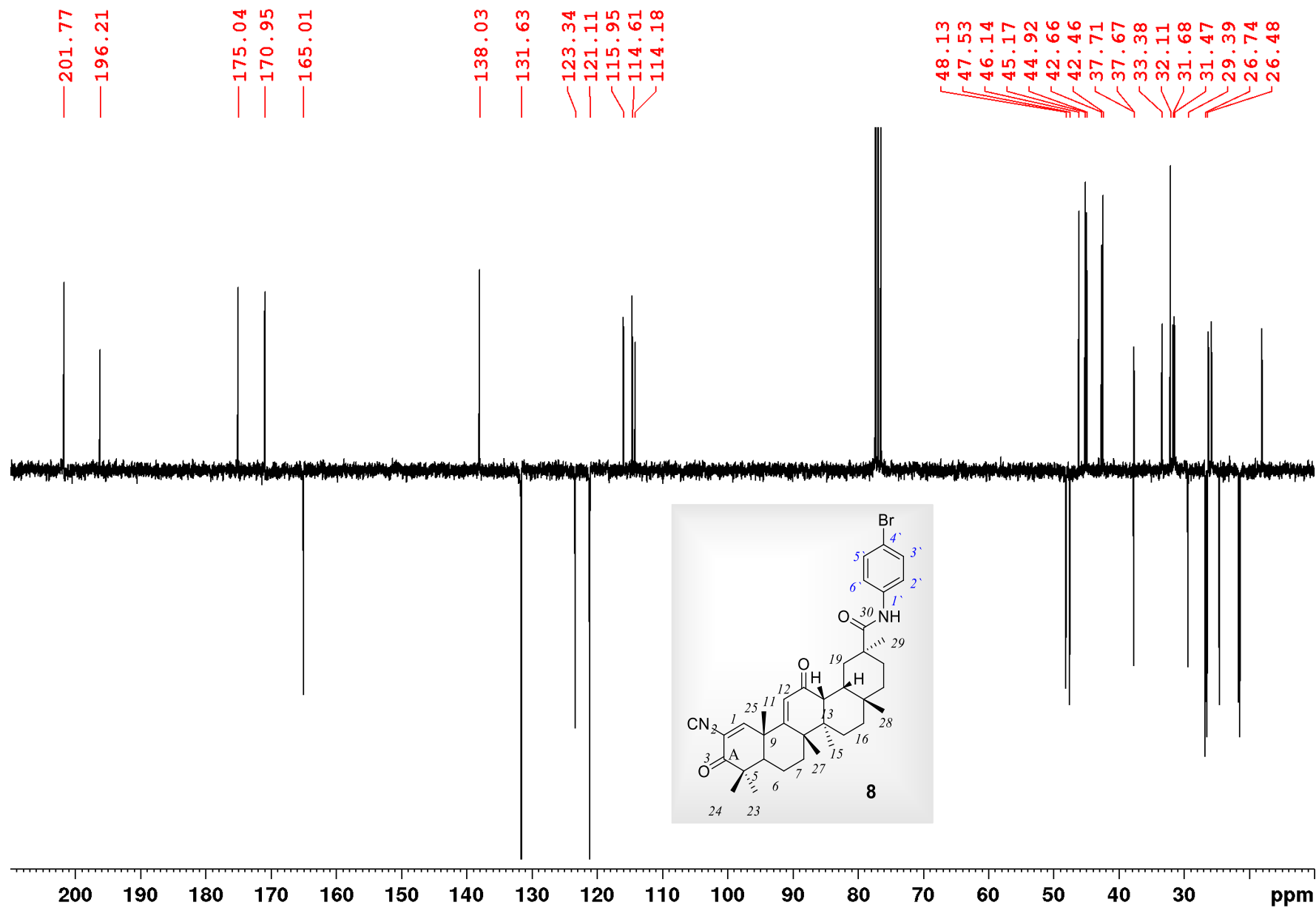
Spectrum of Compound 7, <sup>1</sup>H NMR, 400MHz, CDCl<sub>3</sub>



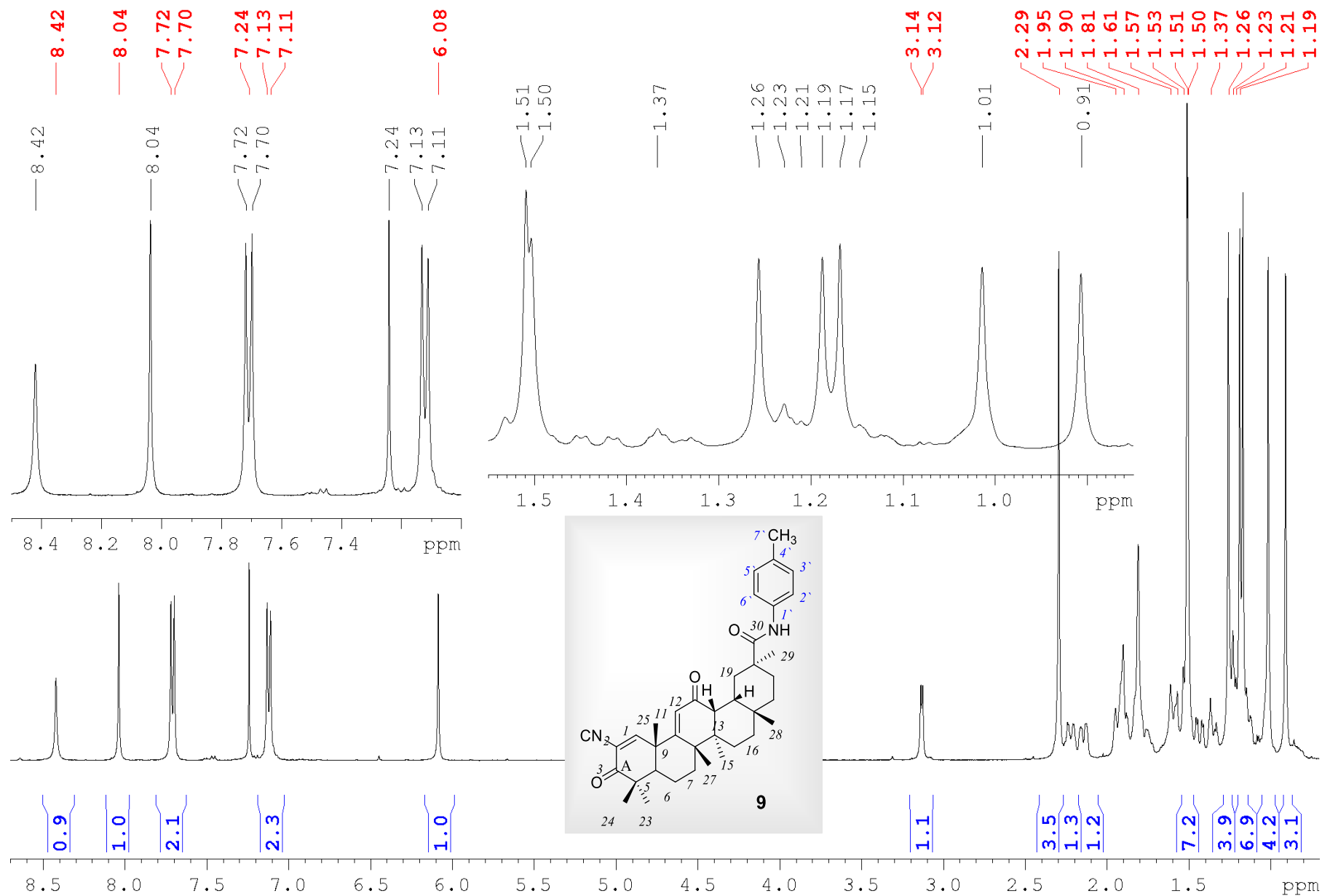


Spectrum of Compound 8,  $^1\text{H}$  NMR, 300MHz,  $\text{CDCl}_3$

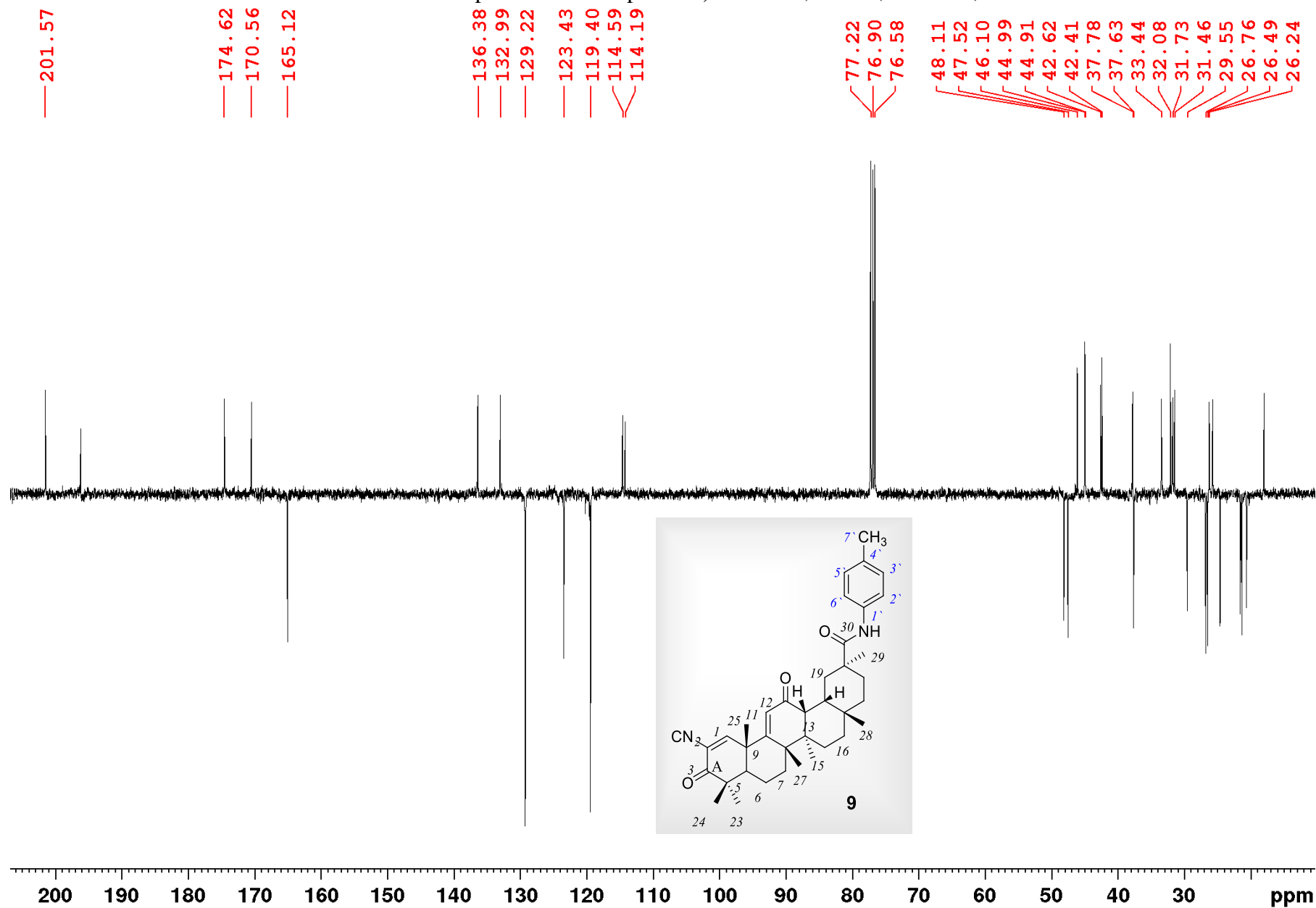




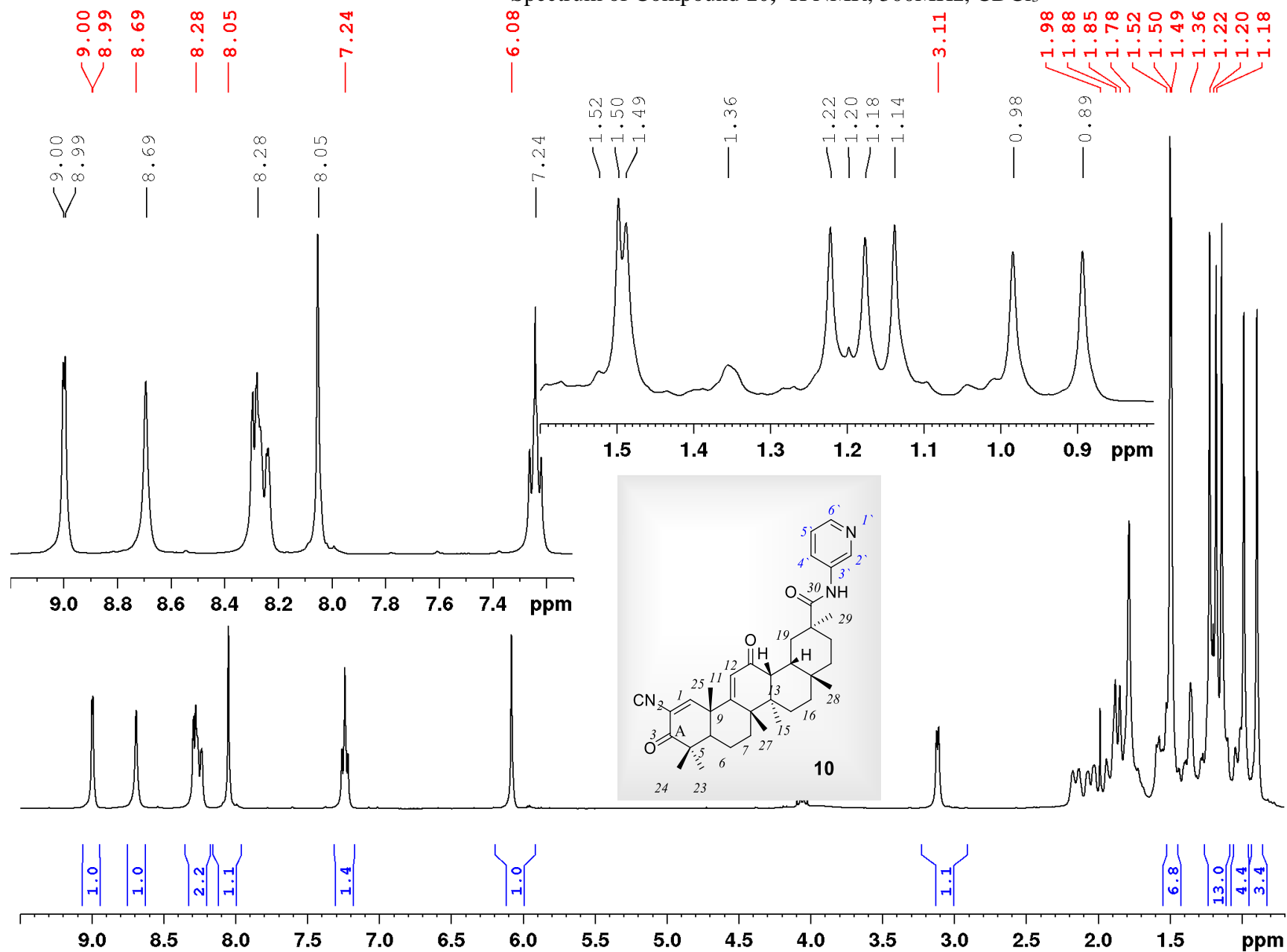
Spectrum of Compound **9**,  $^1\text{H}$  NMR, 400MHz,  $\text{CDCl}_3$



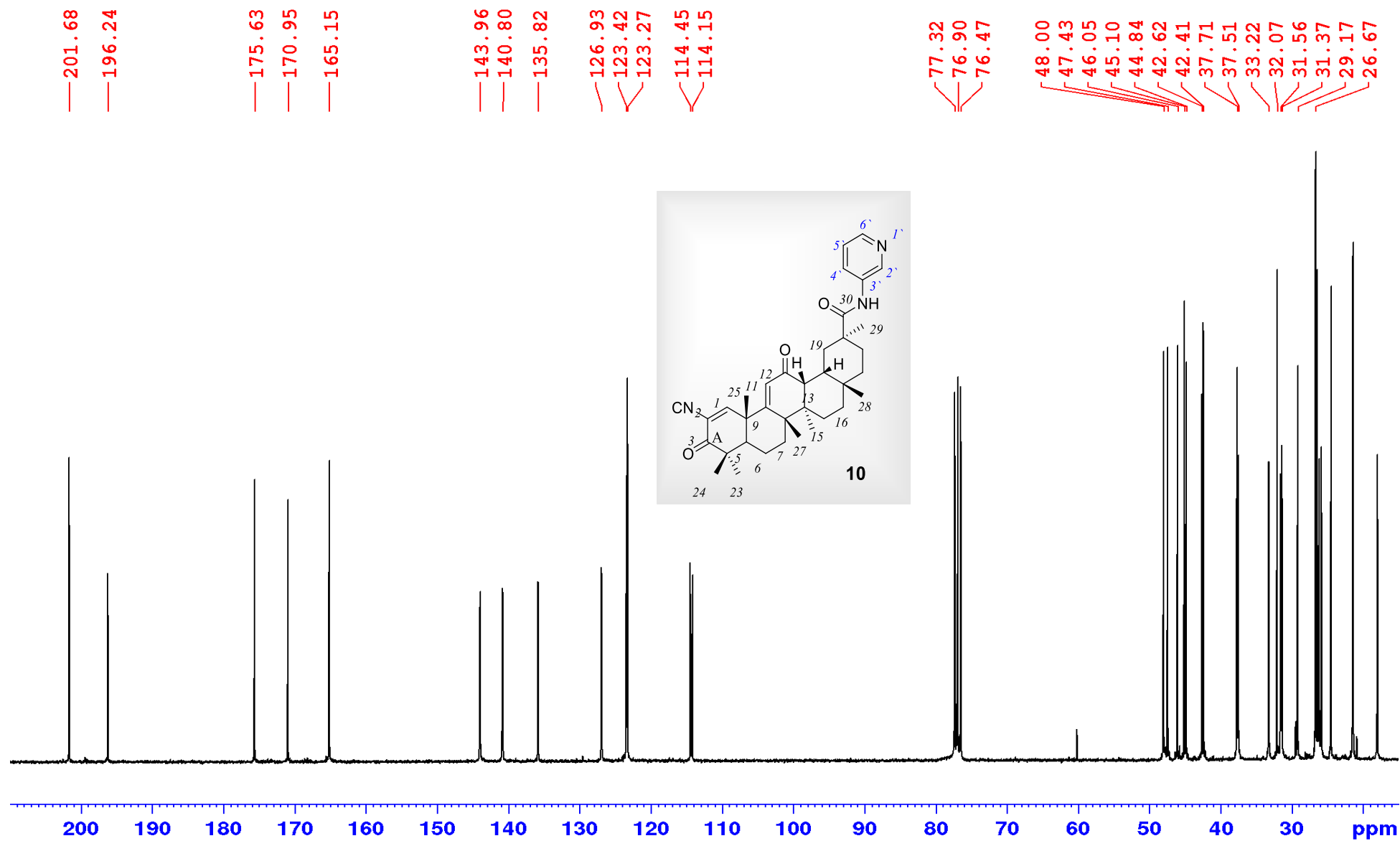
Spectrum of Compound **9**,  $^{13}\text{C}$  NMR, JMOD, 100MHz,  $\text{CDCl}_3$



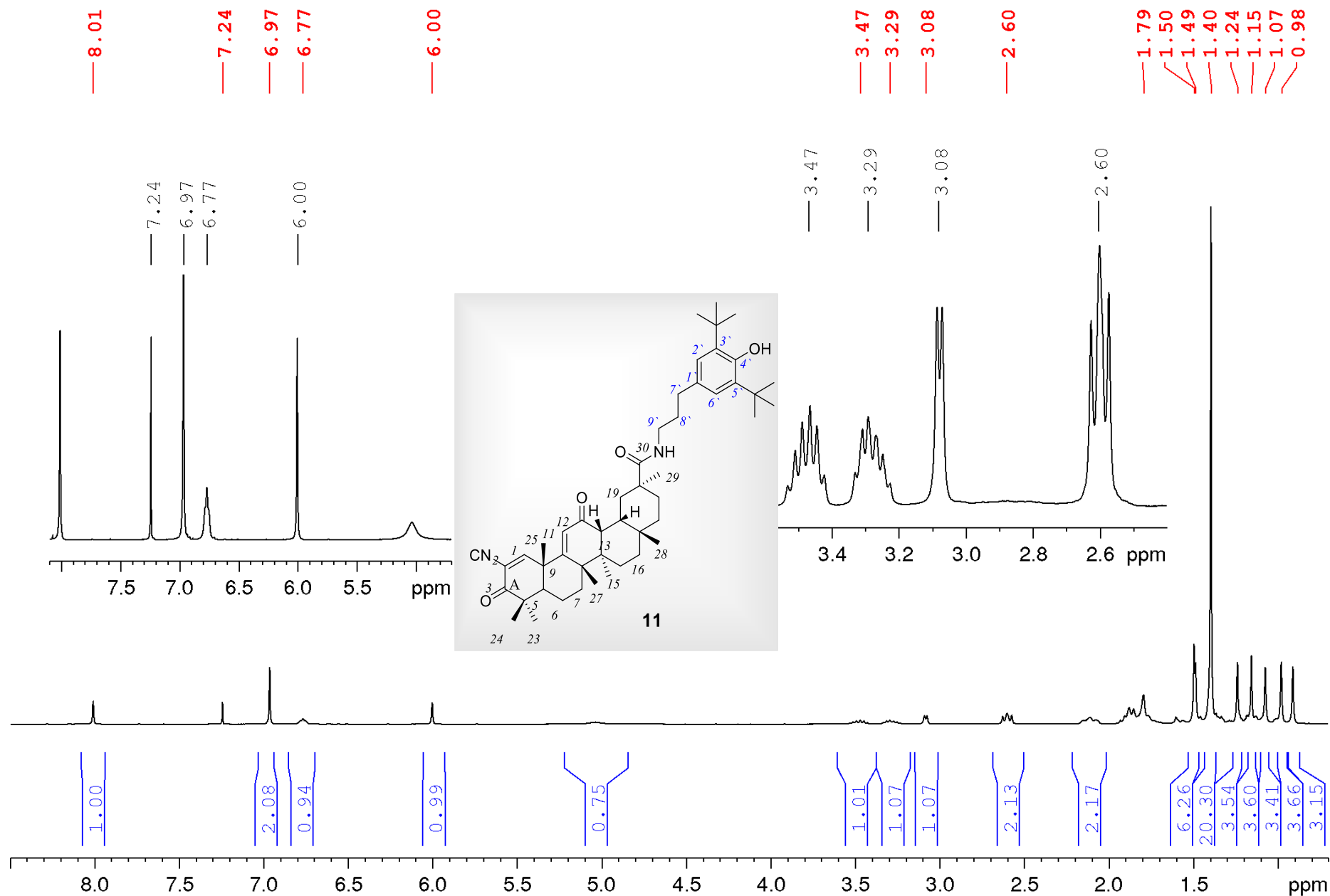
Spectrum of Compound **10**,  $^1\text{H}$  NMR, 300MHz,  $\text{CDCl}_3$



Spectrum of Compound **10**,  $^{13}\text{C}$  NMR, BB, 75 MHz,  $\text{CDCl}_3$



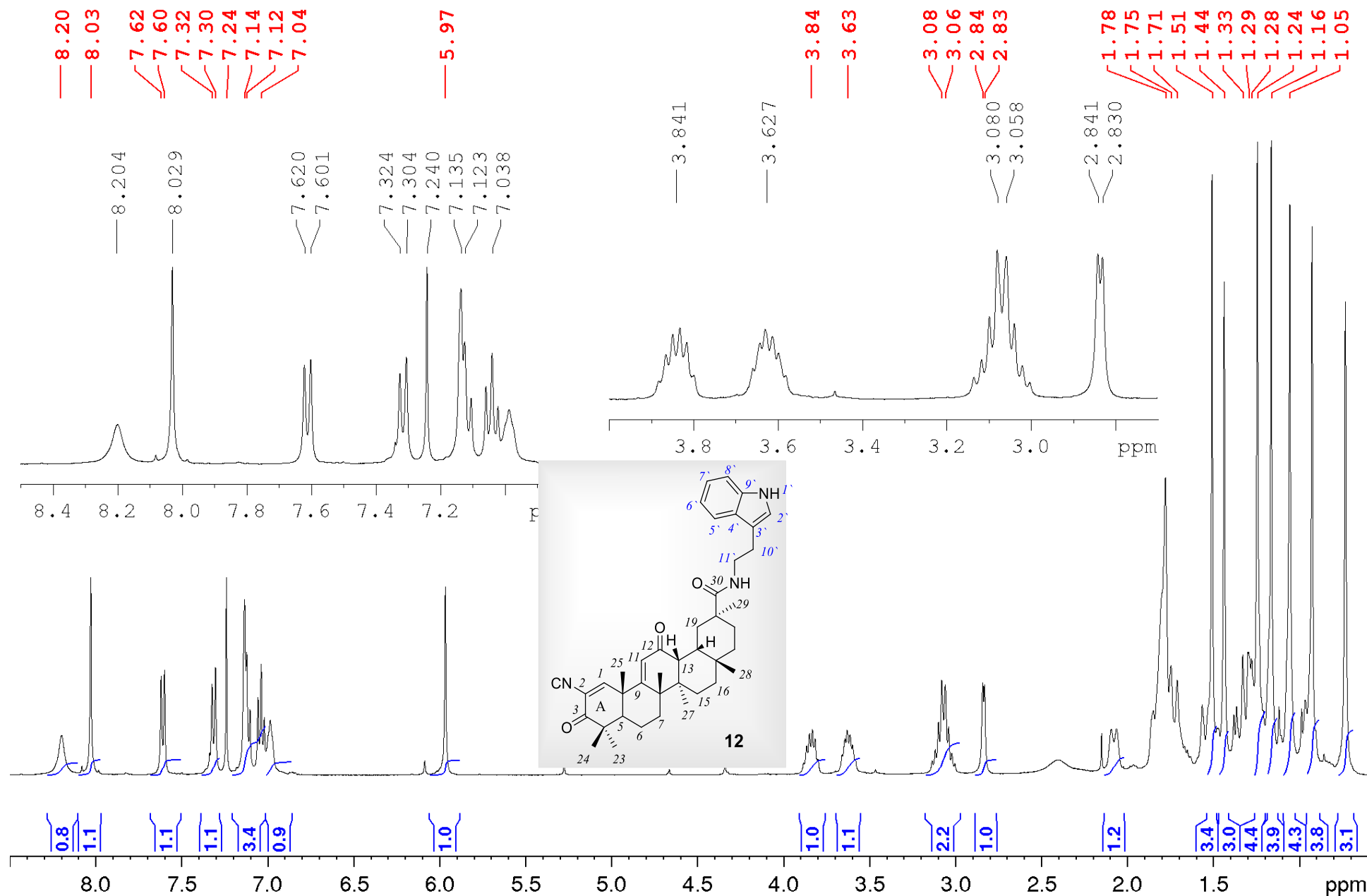
Spectrum of Compound **11**,  $^1\text{H}$  NMR, 300MHz,  $\text{CDCl}_3$



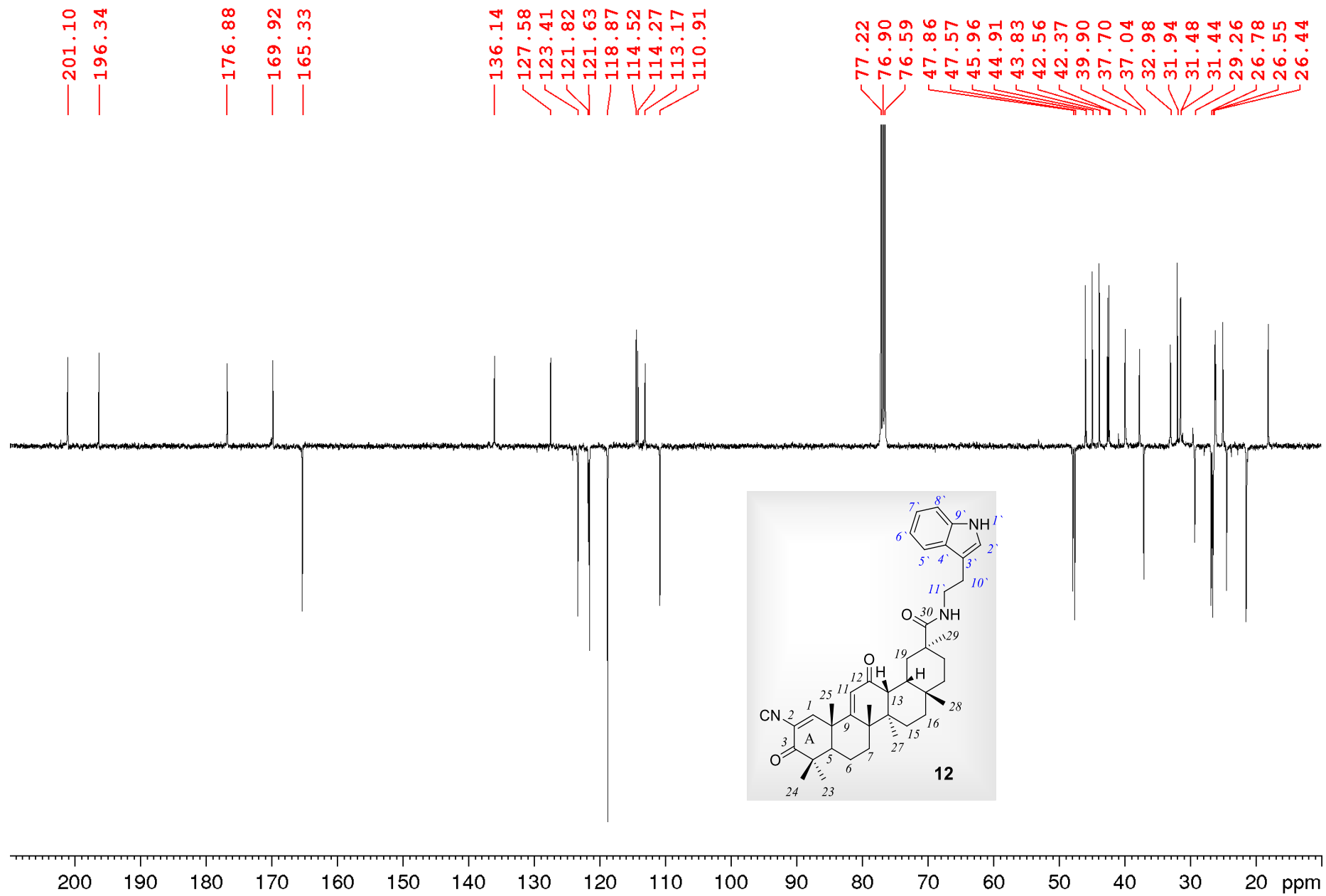
Spectrum of Compound **11**,  $^{13}\text{C}$  NMR, JMOD, 75 MHz,  $\text{CDCl}_3$



Spectrum of Compound **12**,  $^1\text{H}$  NMR, 400MHz,  $\text{CDCl}_3$



Spectrum of Compound **12**,  $^{13}\text{C}$  NMR, JMOD, 400MHz,  $\text{CDCl}_3$



## Supplementary Table S1

Detection parameters of **12** and 2,5-BDPO (internal standard) in MRM mode.

Analyte and its parent ion (Q1 m/z, Da)	Fragment ion (Q3 m/z, Da)	DP, V	CE, V	CXP, V
<b>12</b> (634.5)	446.4 <sup>a)</sup>	16	55	10
	144.1 <sup>b)</sup>	36	41	28
	428.5 <sup>b)</sup>	91	51	6
2,5-BDPO (365.3)	176.2 <sup>a)</sup>	146	43	18
	336.2 <sup>b)</sup>	146	31	18
	322.2 <sup>b)</sup>	146	35	16

<sup>a)</sup> Quantifier.

<sup>b)</sup> Qualifier.