

Supporting Information

Synthesis and evaluation of cytotoxic activity and pro-apoptotic effects of novel spiro-4*H*-pyran derivatives on A549 cancer cells

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Experimental Section

General remarks:

Melting points were measured on an Electrothermal 9100 apparatus. Mass spectra were recorded with an Agilent 5975C VL MSD with Triple-Axis Detector operating at an ionization potential of 70 eV. ^1H and ^{13}C NMR spectra were measured (DMSO) with a Bruker DRX-300 AVANCE spectrometer at 300 and 75 MHz, respectively. IR spectra were recorded on a Bruker Tensor 27, $\bar{\nu}$ in cm^{-1} . All NMR spectra at room temperature were determined in $\text{DMSO}-d_6$. Chemical shifts are reported in parts per million (δ) downfield from an internal tetramethylsilane reference. Coupling constants (J values) are reported in Hertz (Hz), and spin multiplicities are indicated by the following symbols: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet). All chemicals were purchased from Merck or Aldrich and were used without further purification.

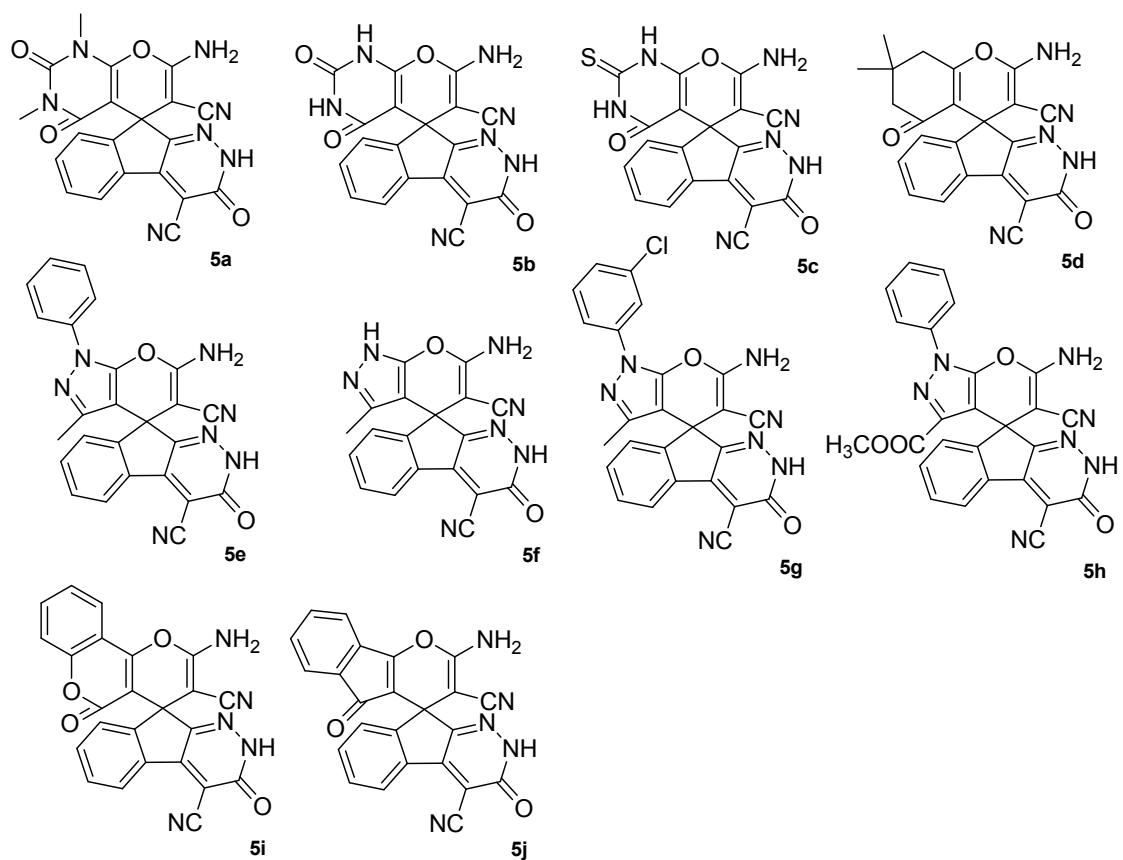
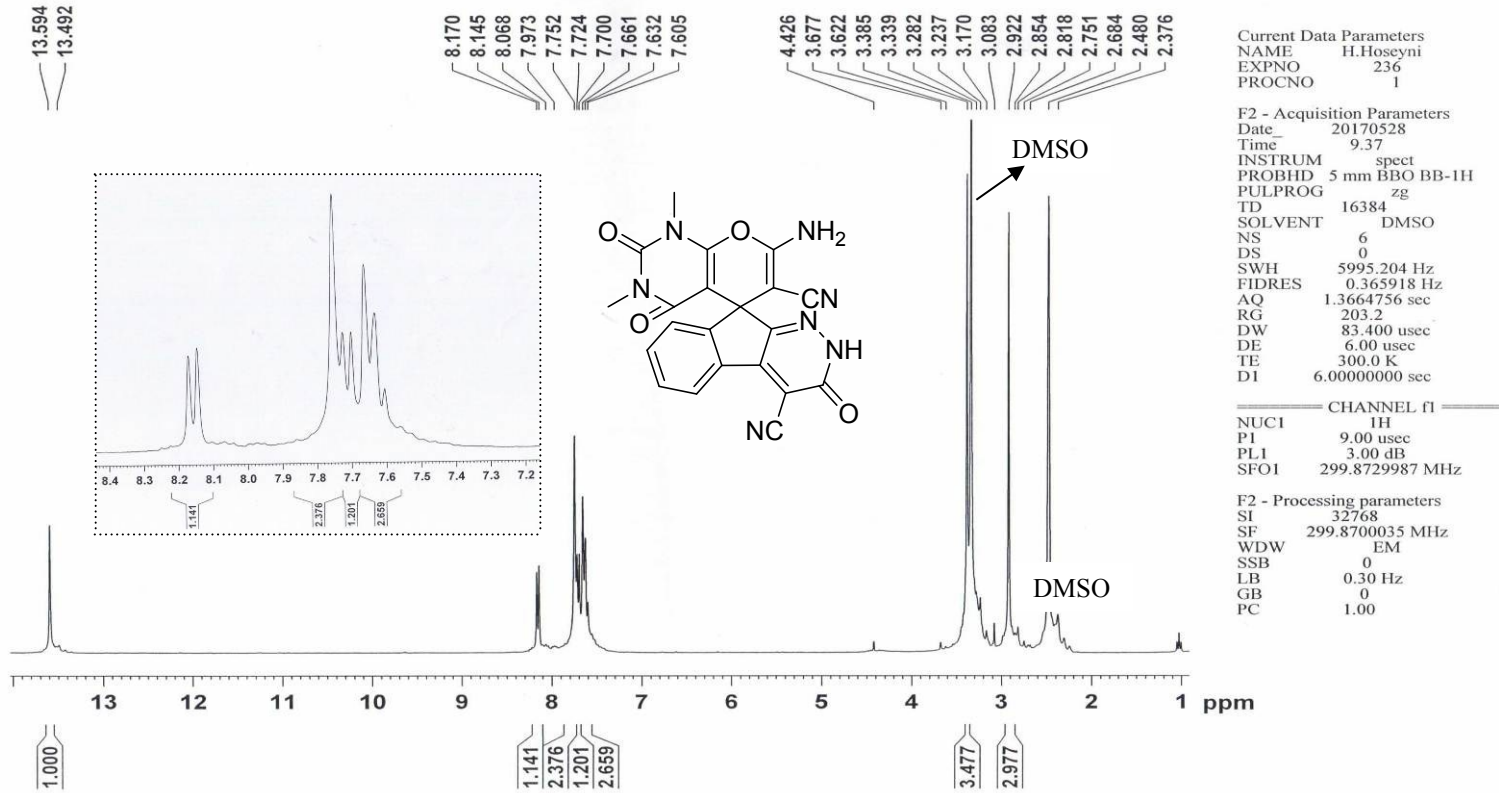
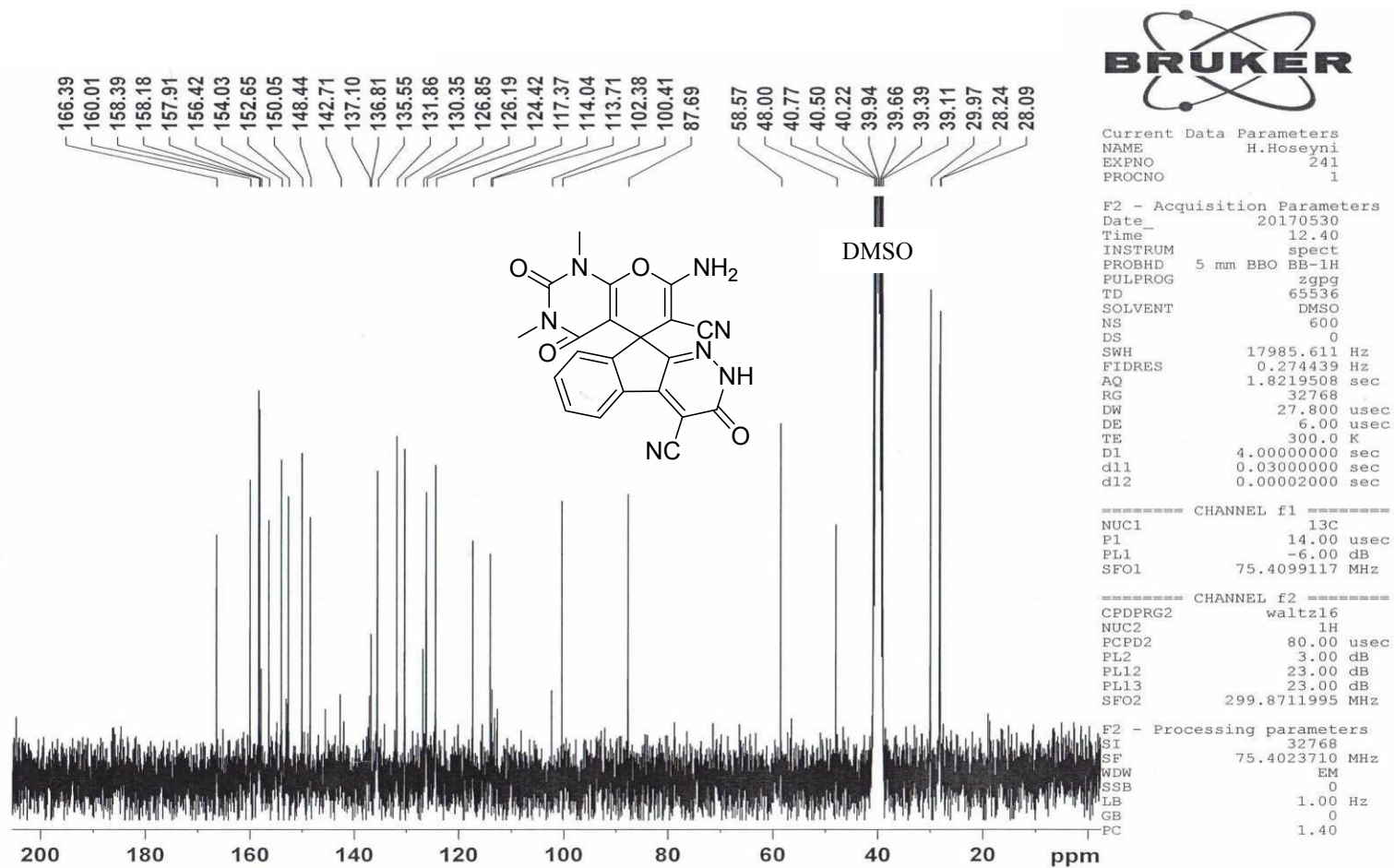


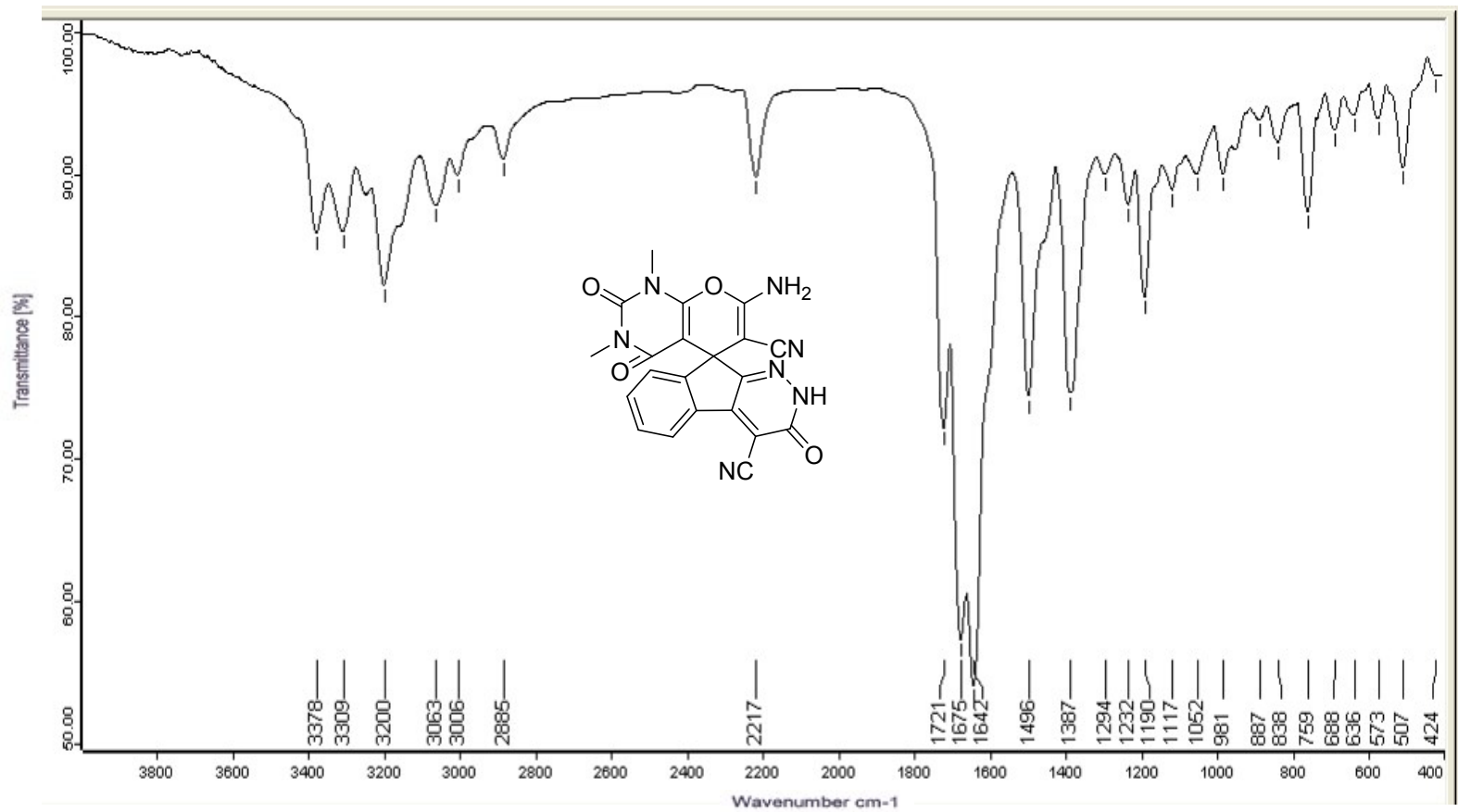
Figure 1. Structure of all products **5**

The structures of all products **5a-j** were deduced from their ^1H NMR, and ^{13}C NMR, IR and Mass spectra (see the Supporting Information)



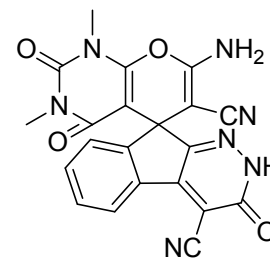
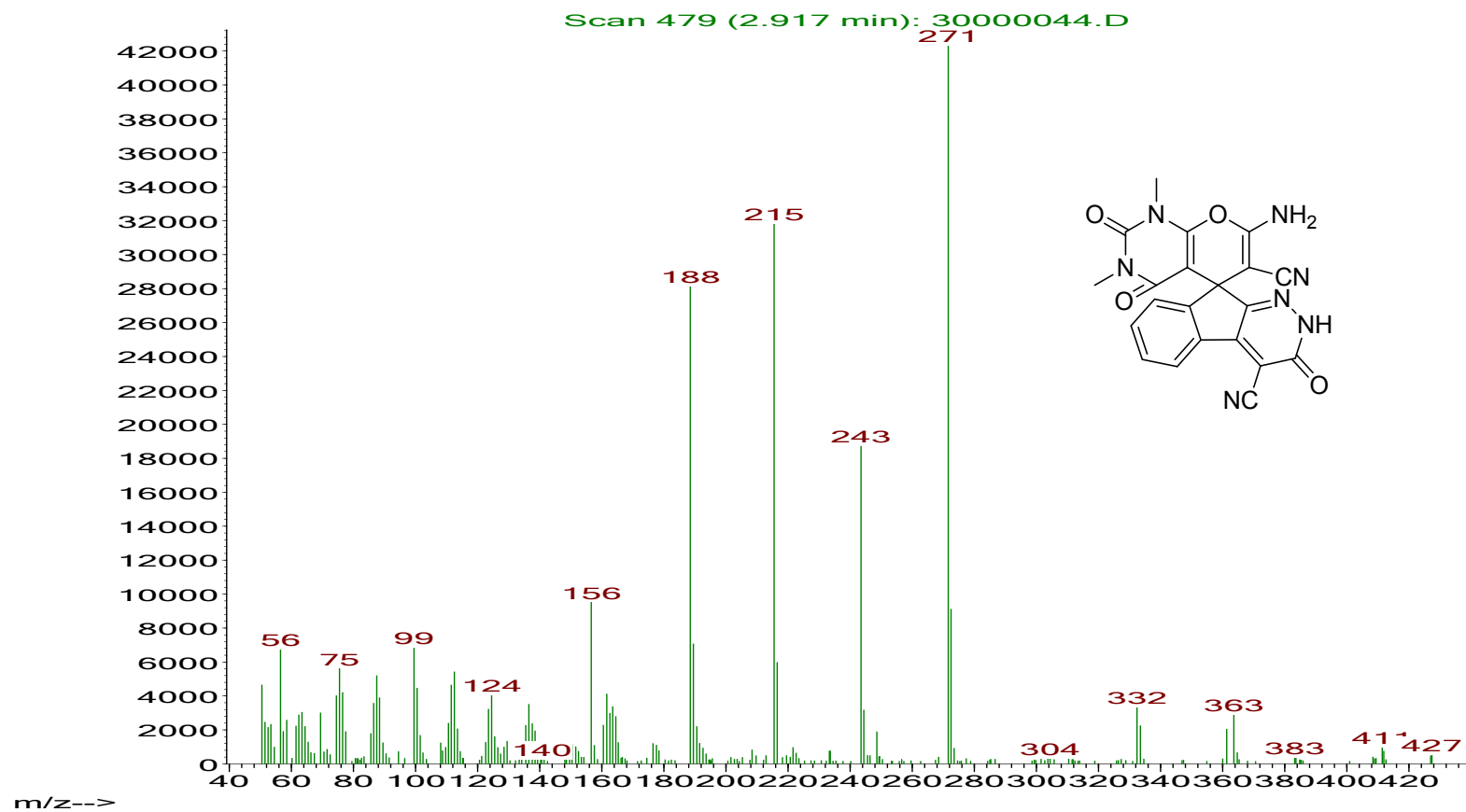
¹H NMR of 5a

 ^{13}C NMR of 5a

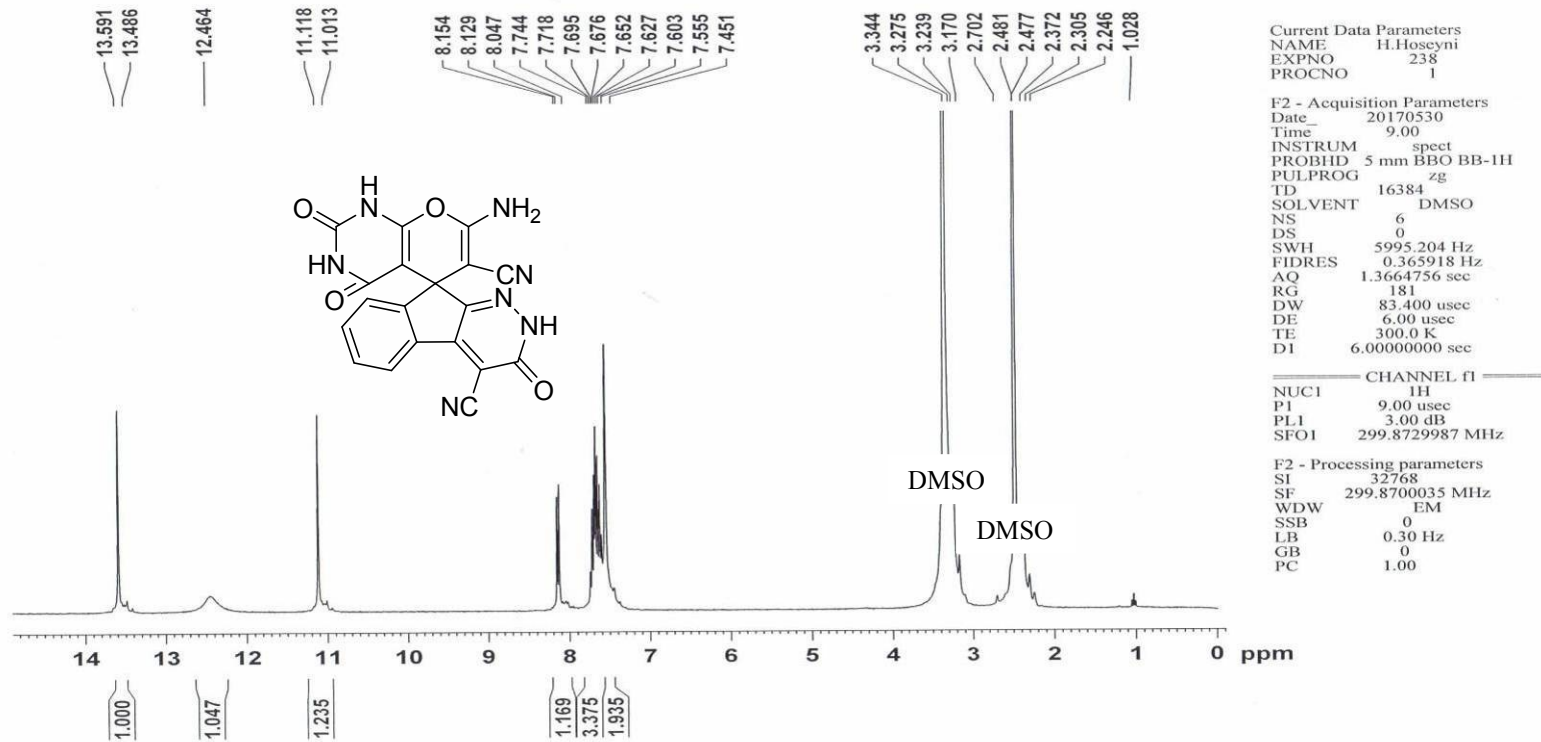


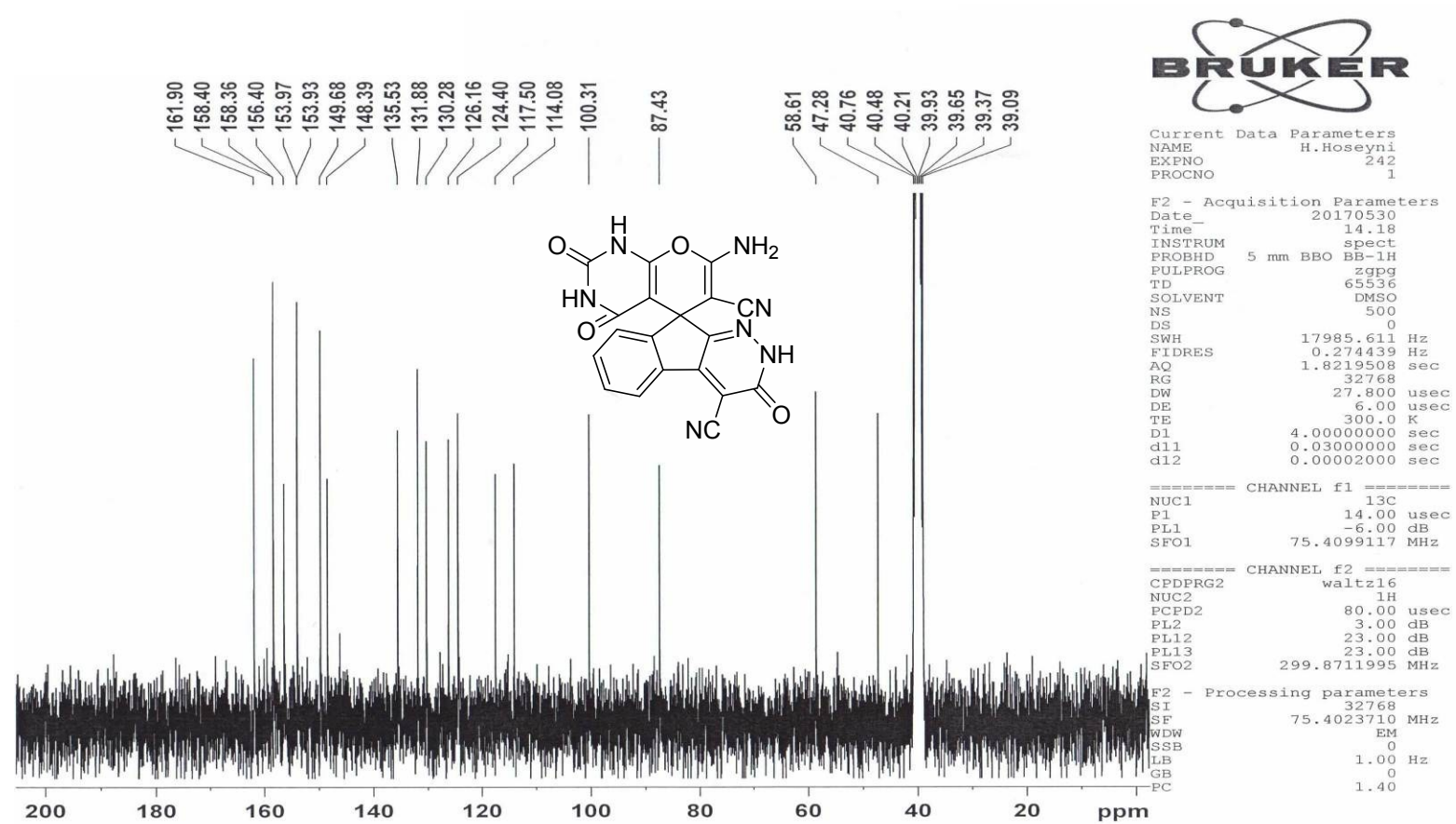
IR of 5a

Abundance

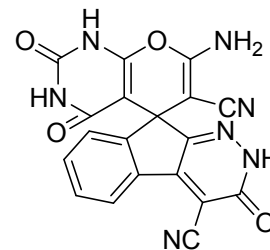
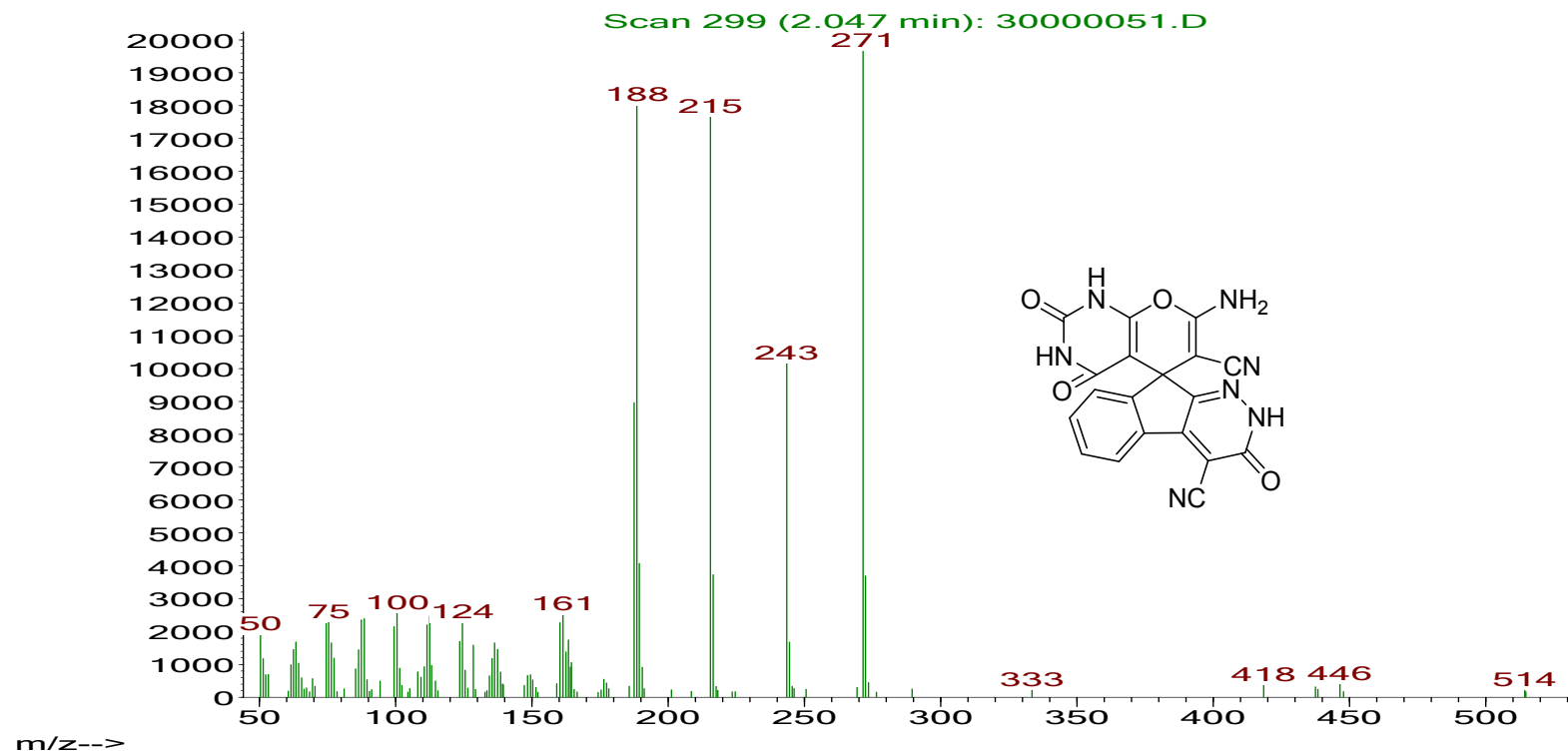


MS of 5a

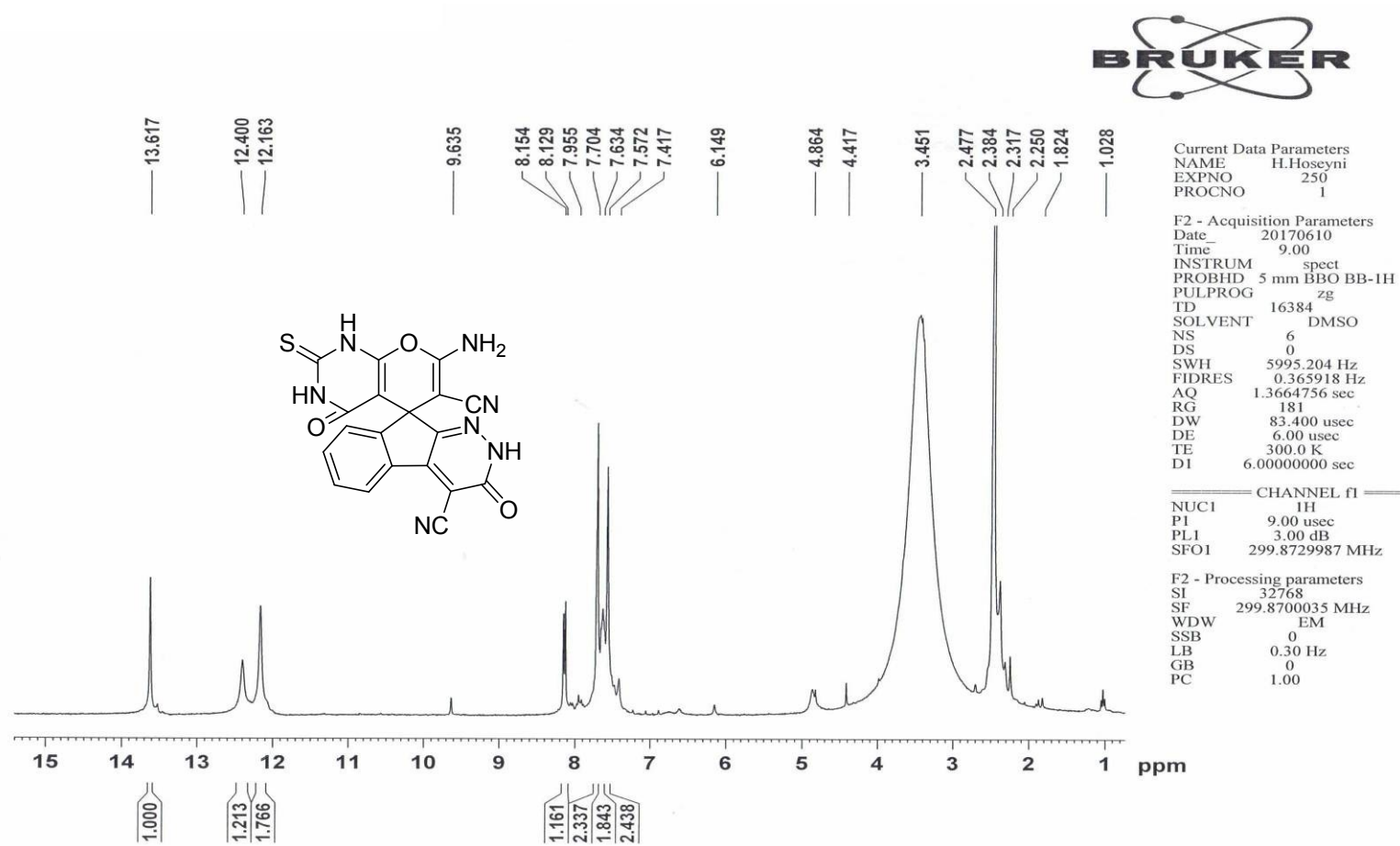


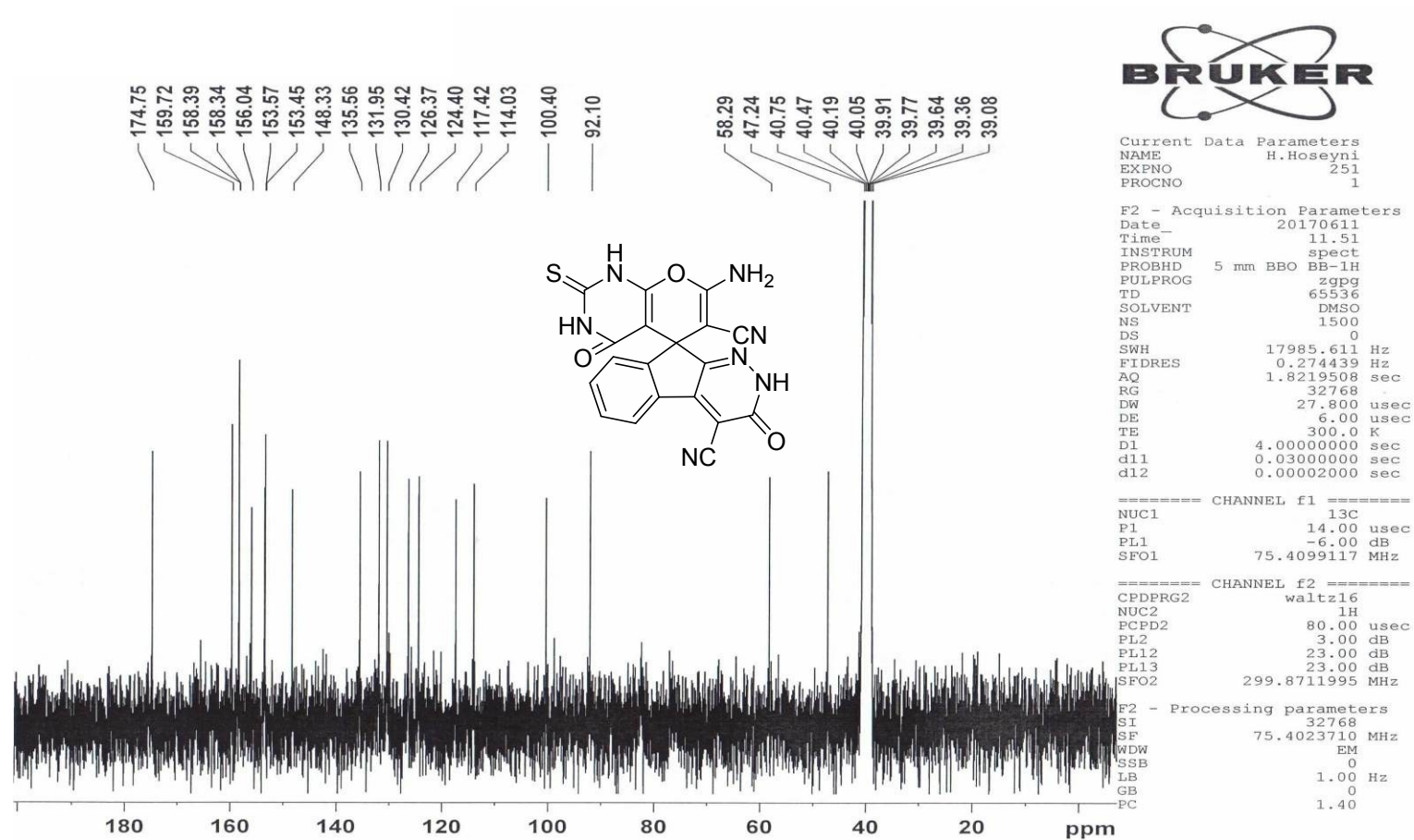
¹³C NMR of 5b

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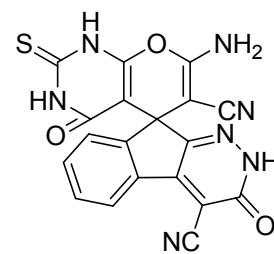
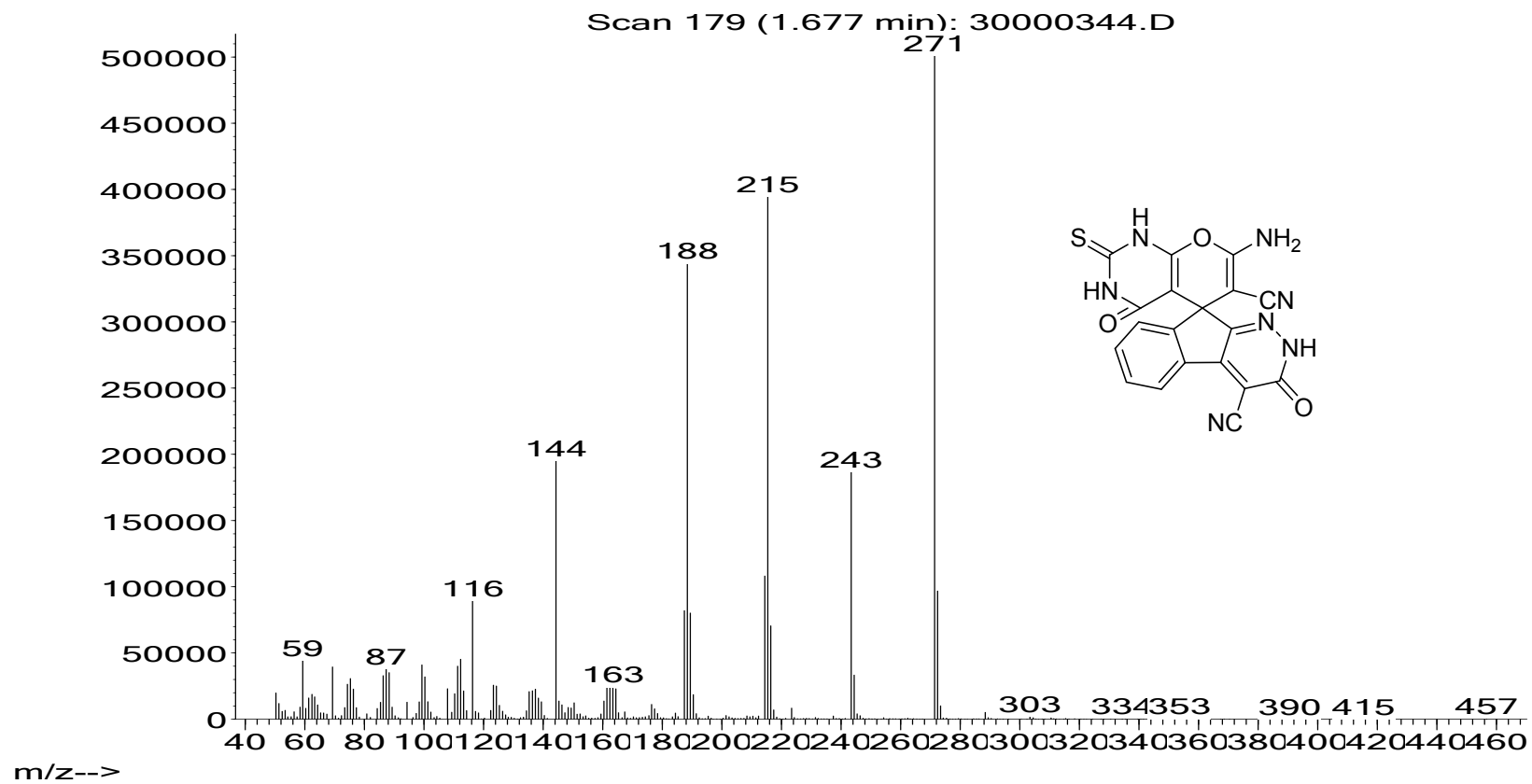


MS of 5b

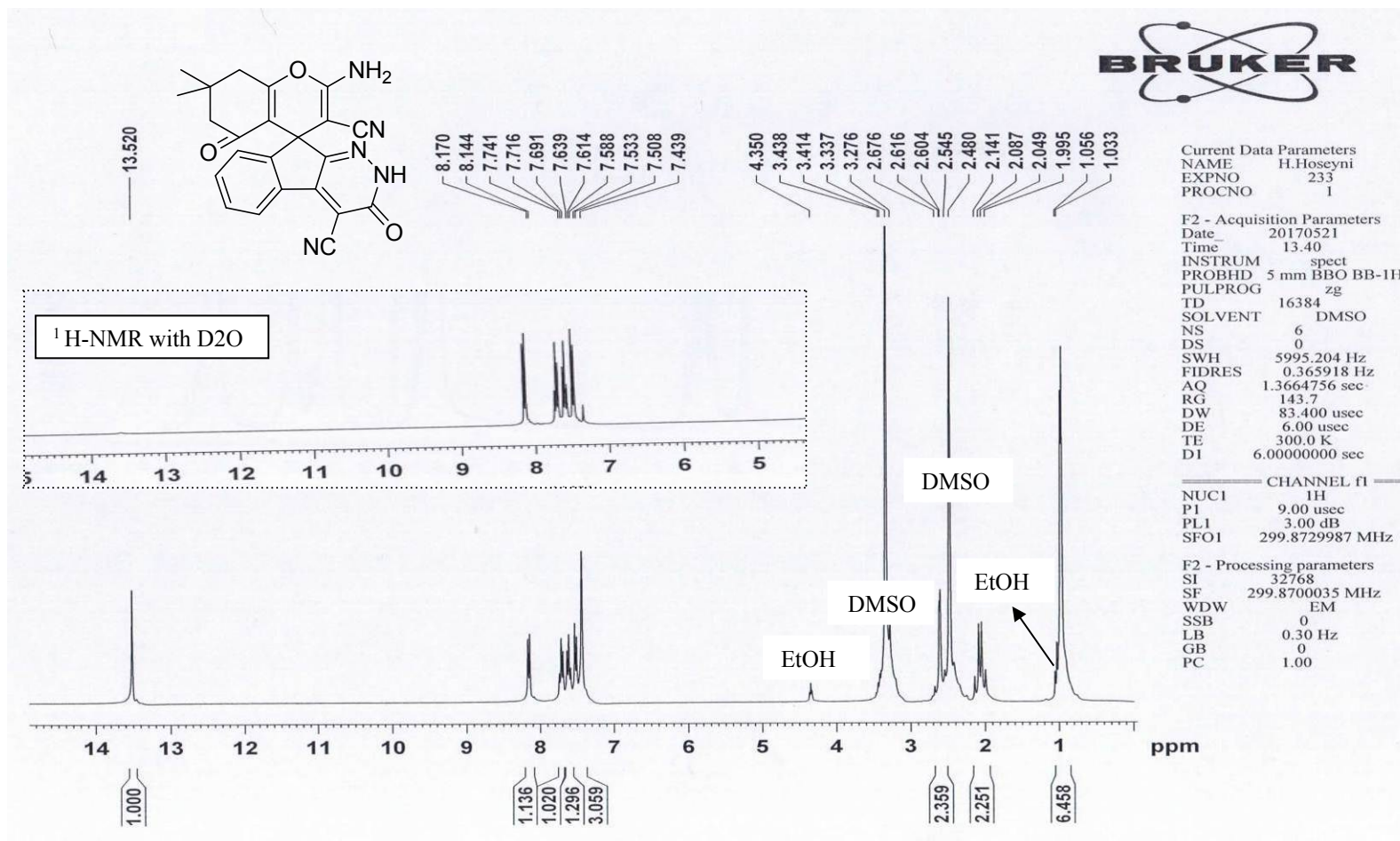
 ^1H NMR of 5c

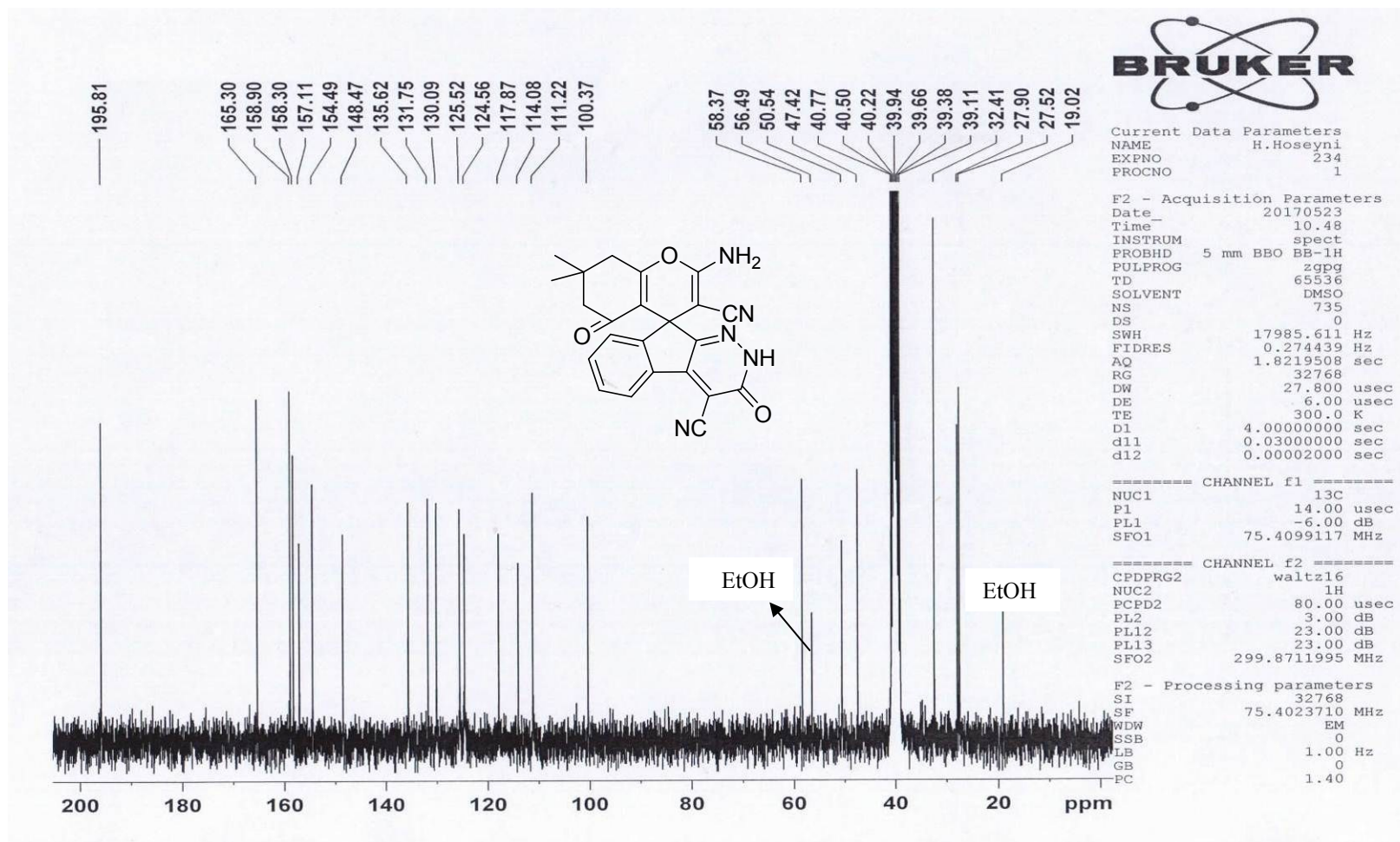


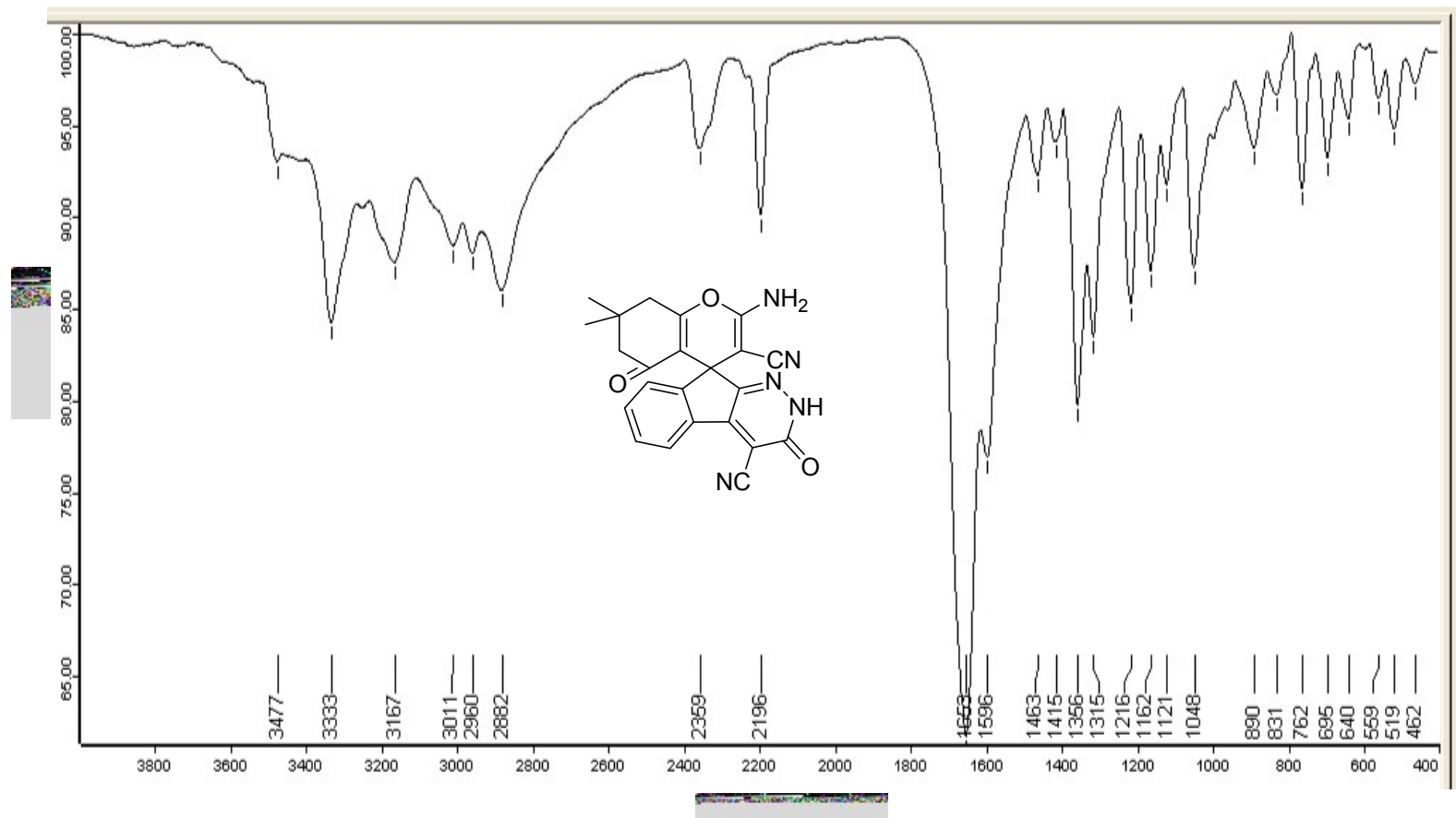
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MS of 5c



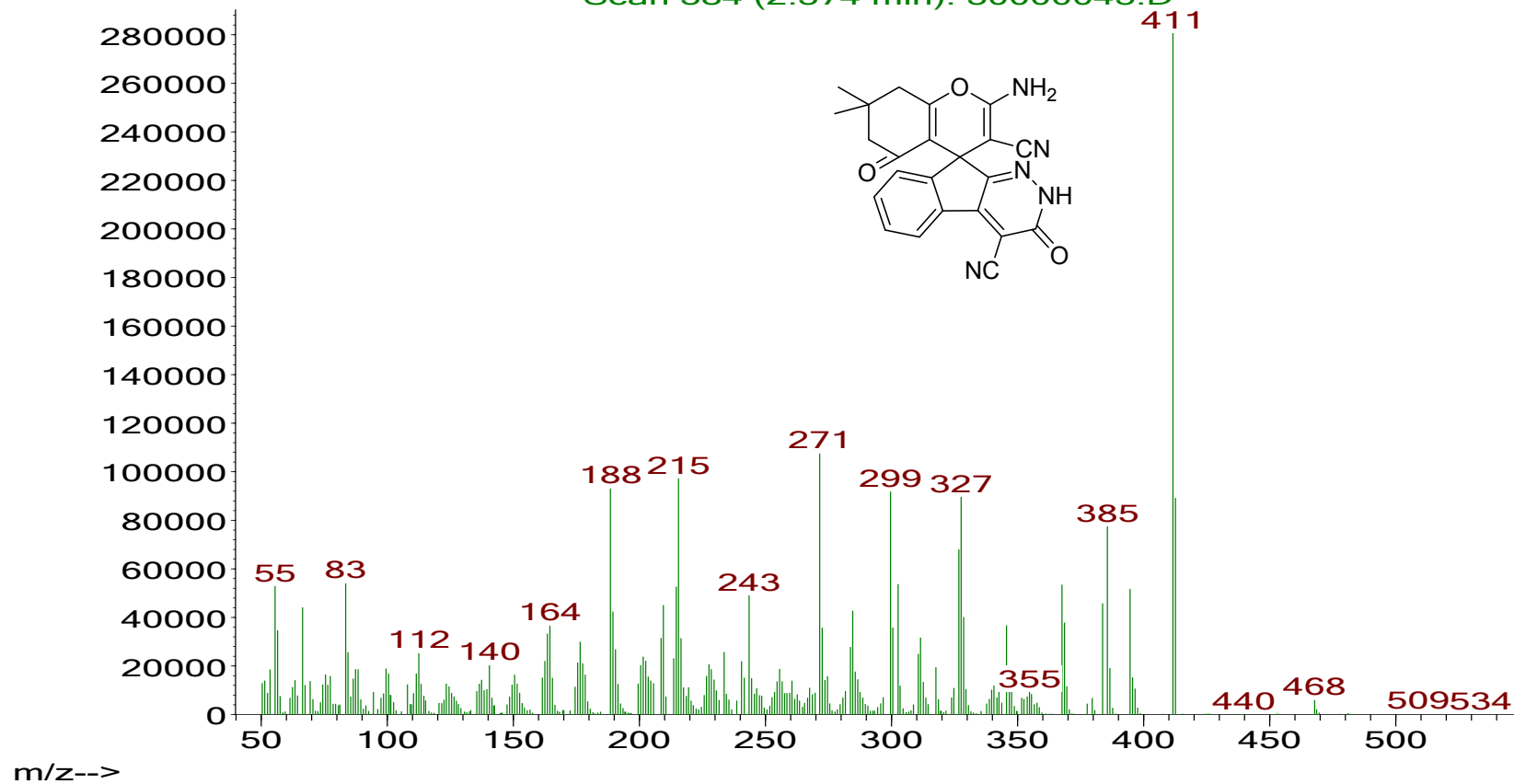




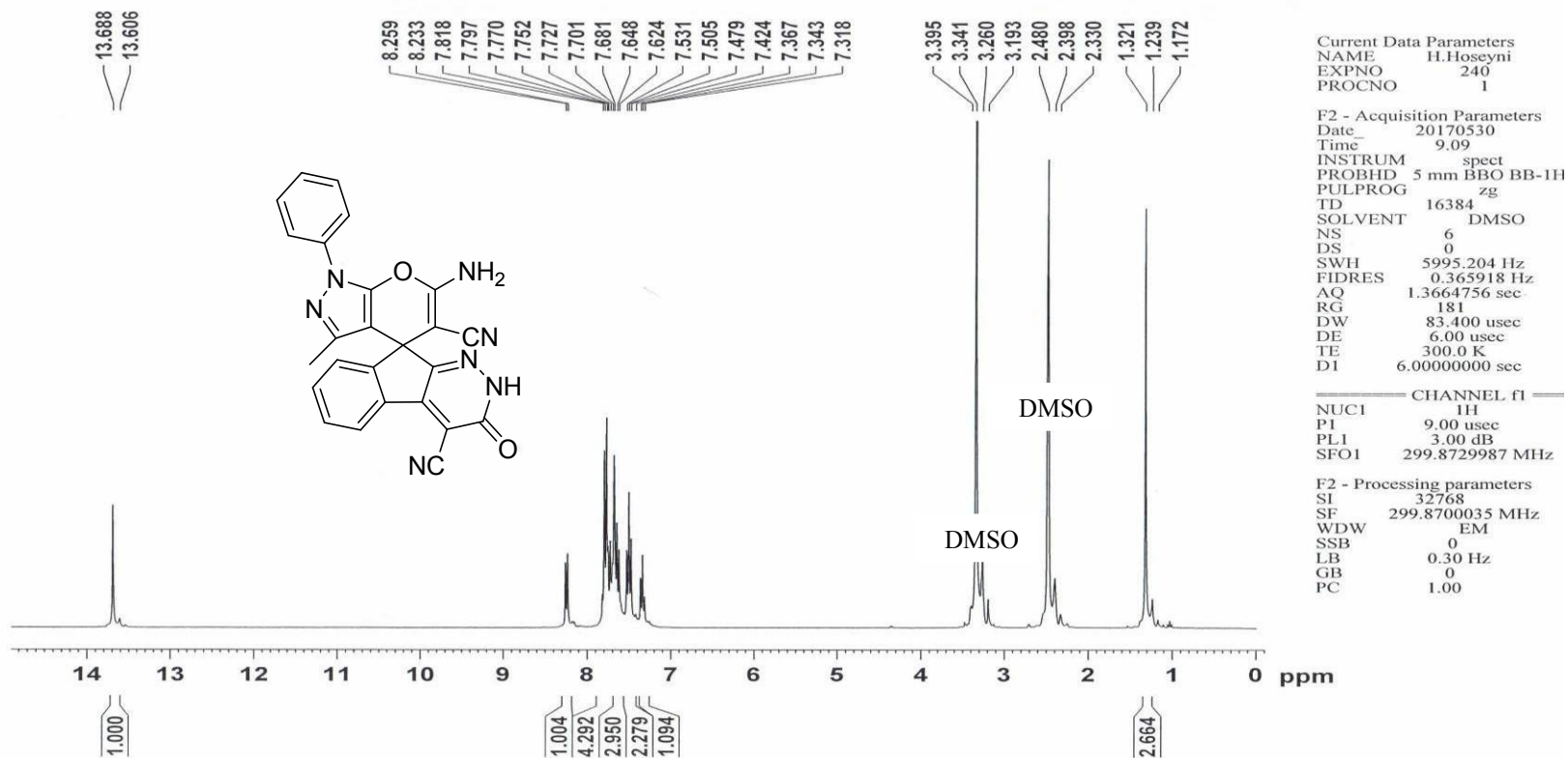
IR of 5d

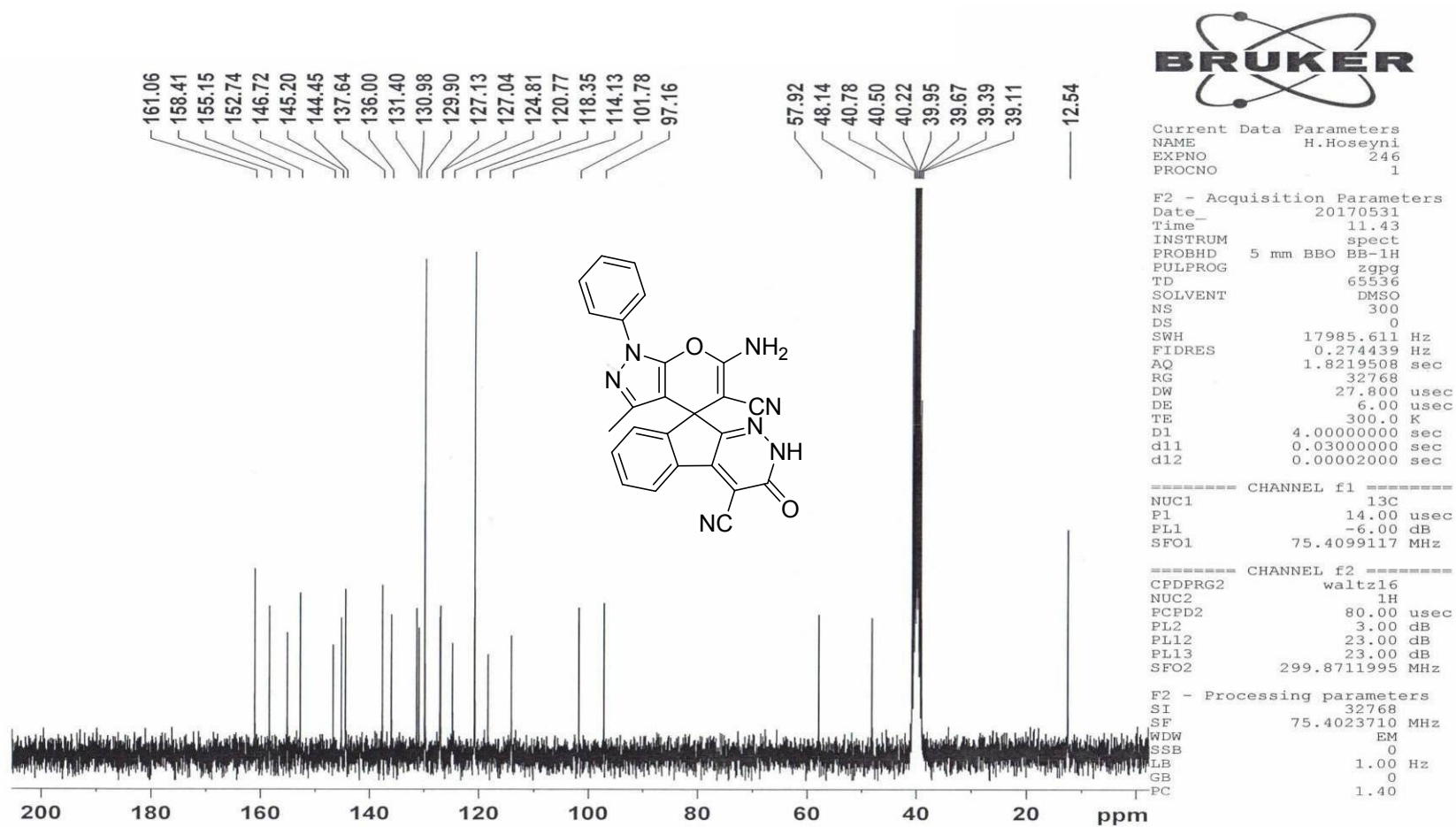
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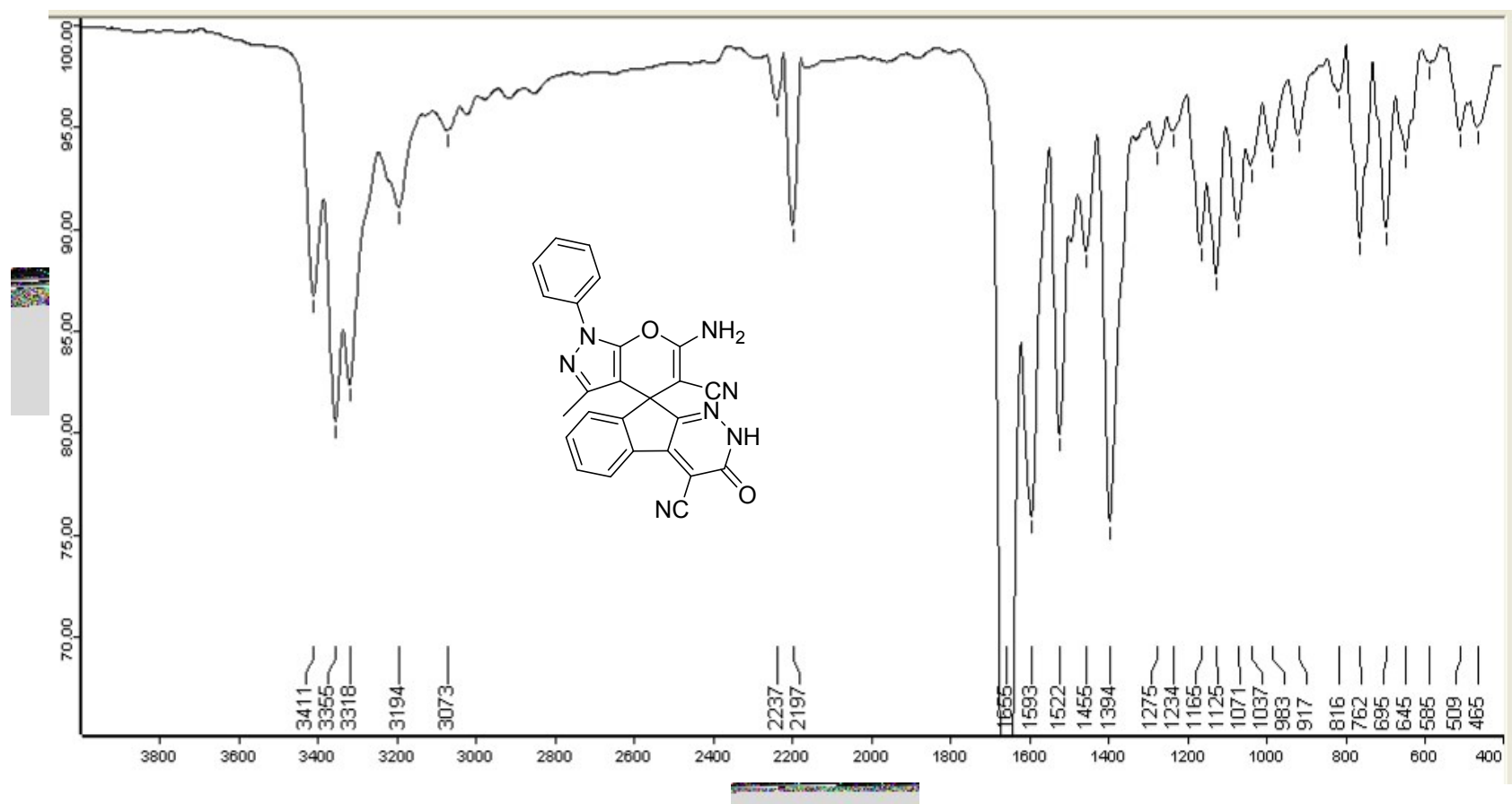
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MS of 5d

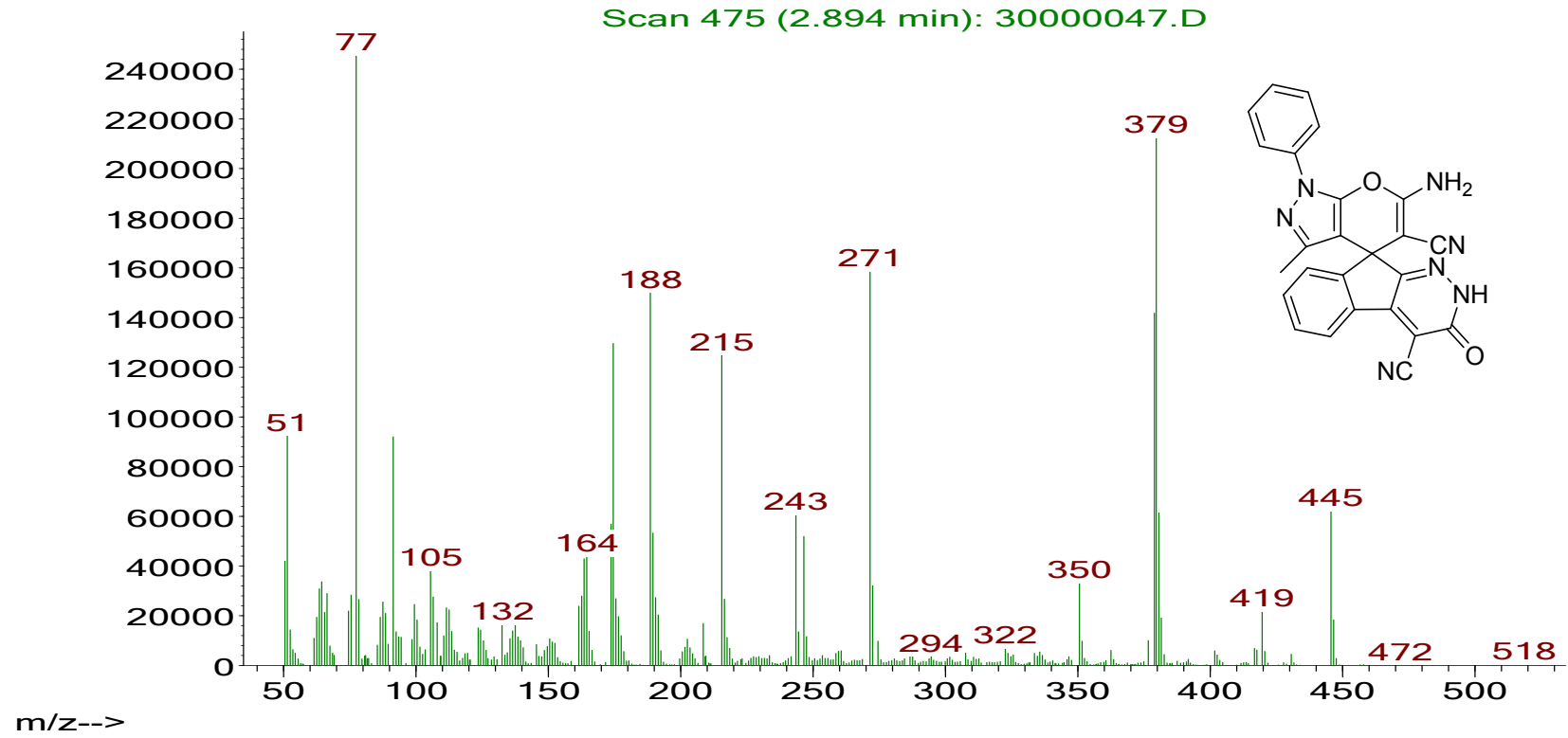


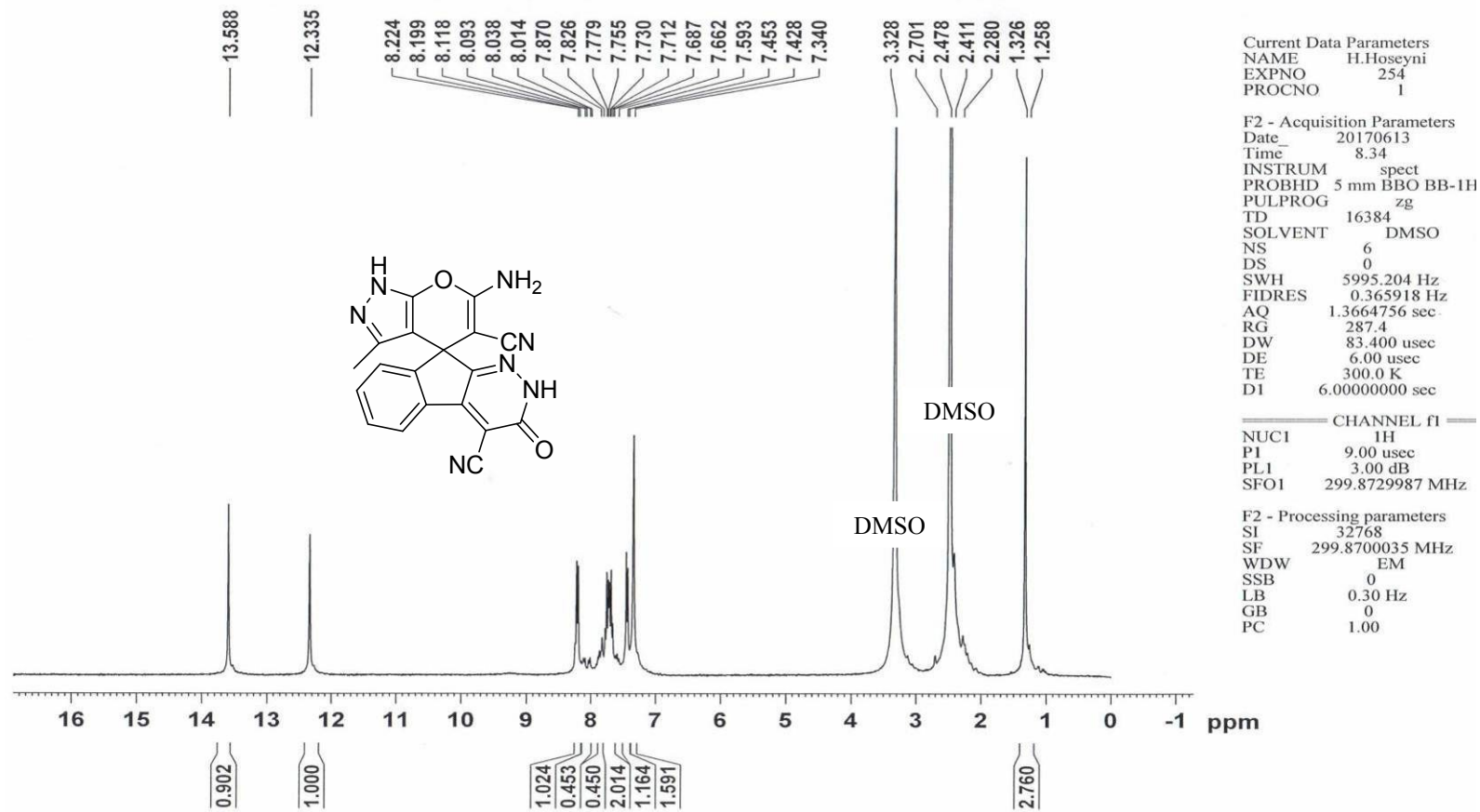
¹³C NMR of 5e

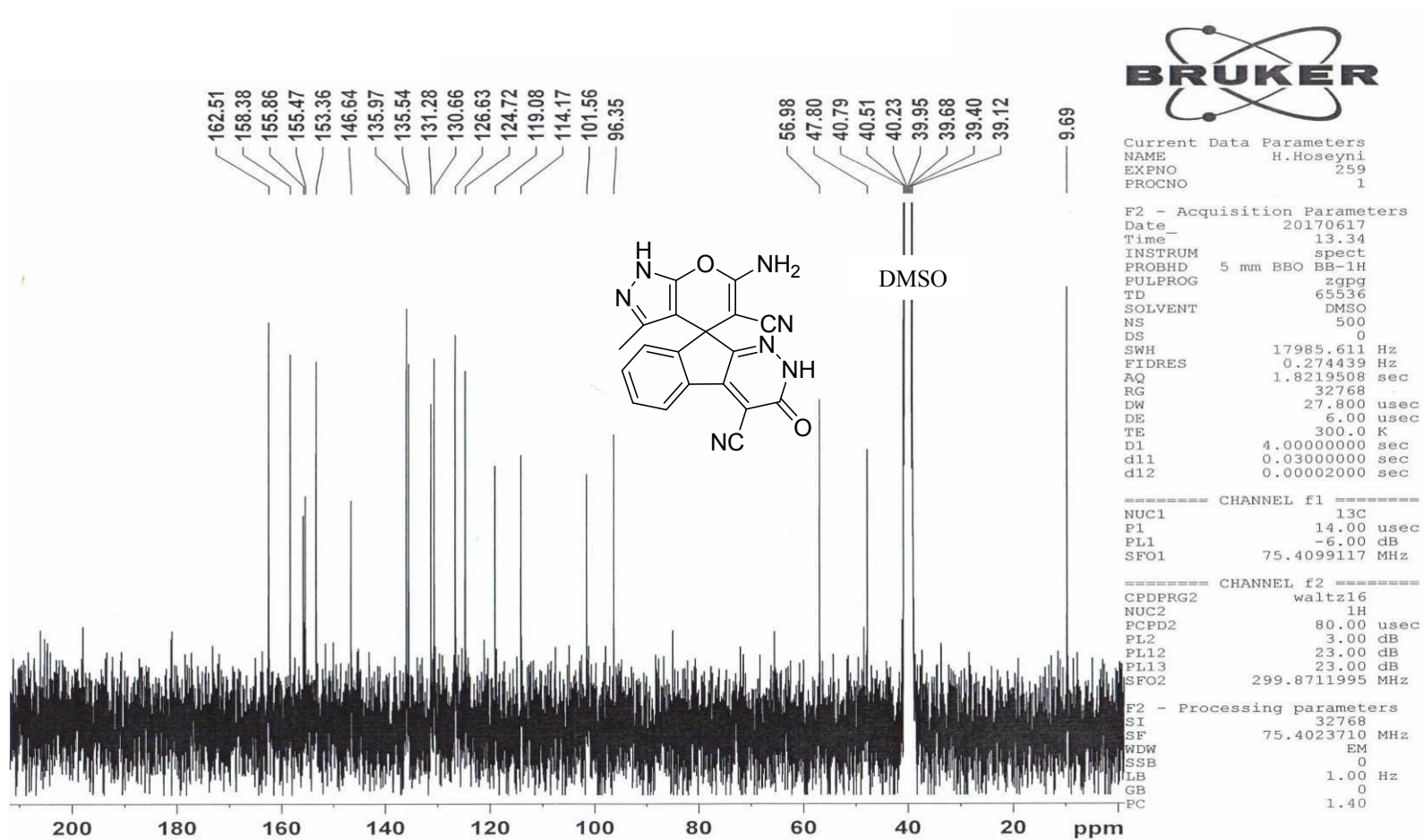


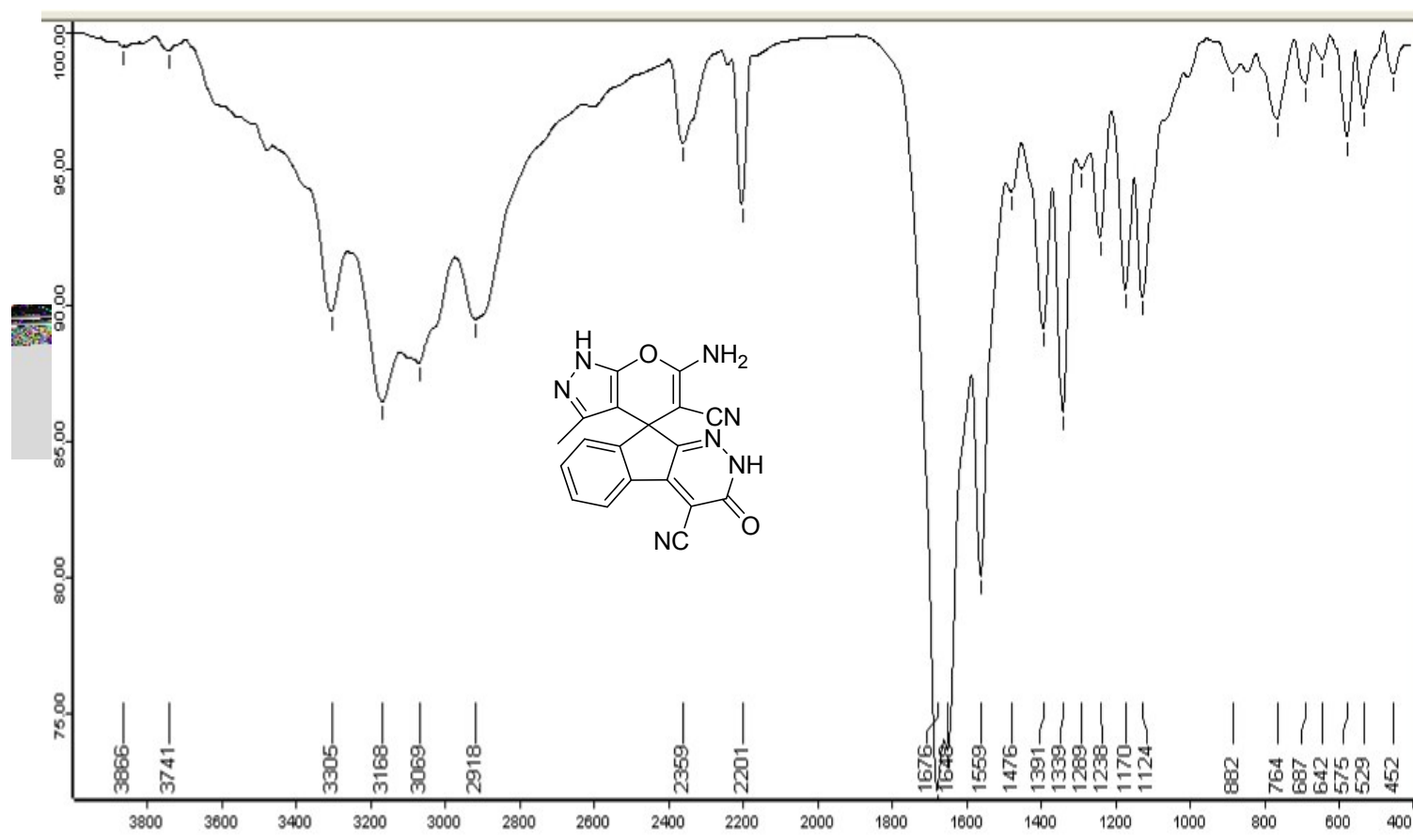
IR of 5e

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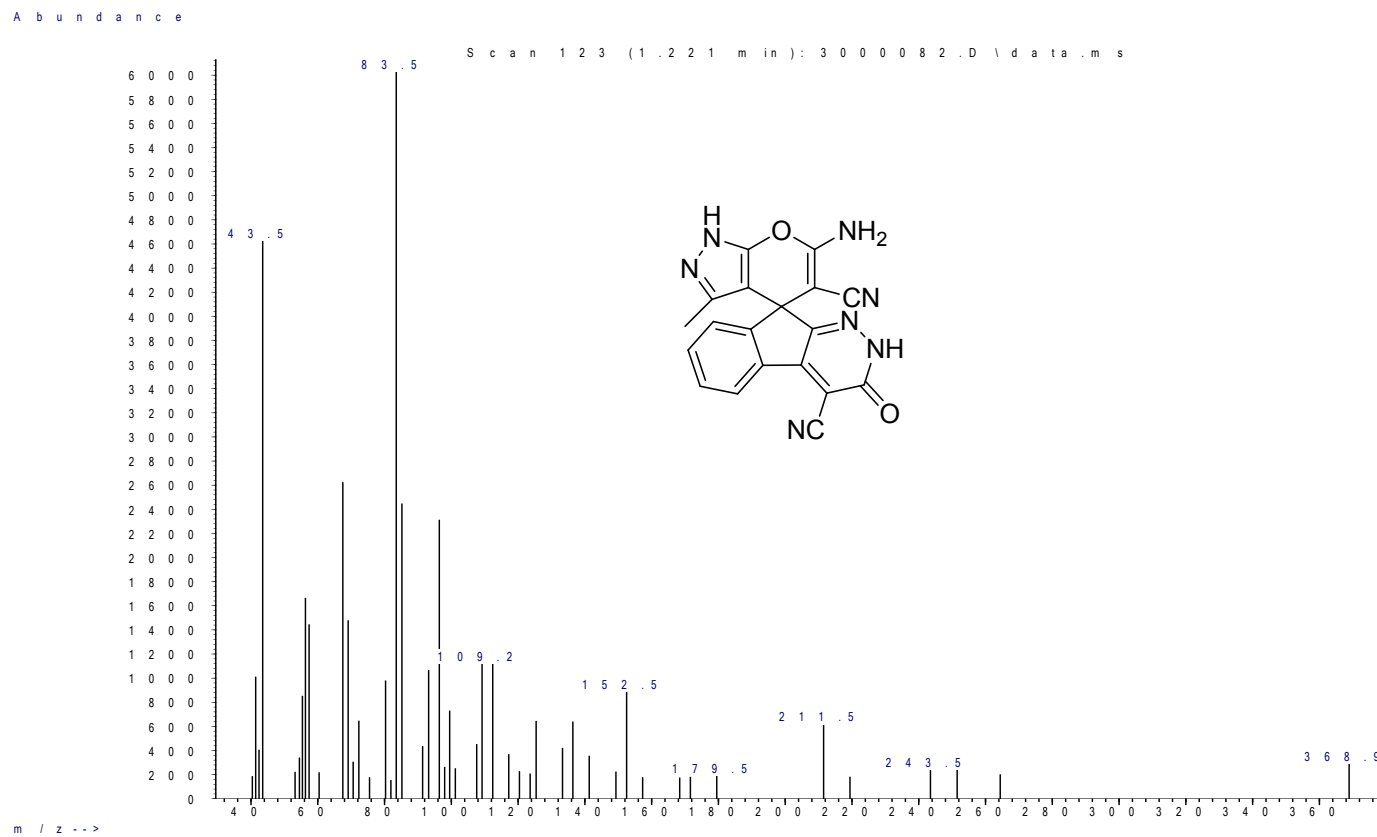




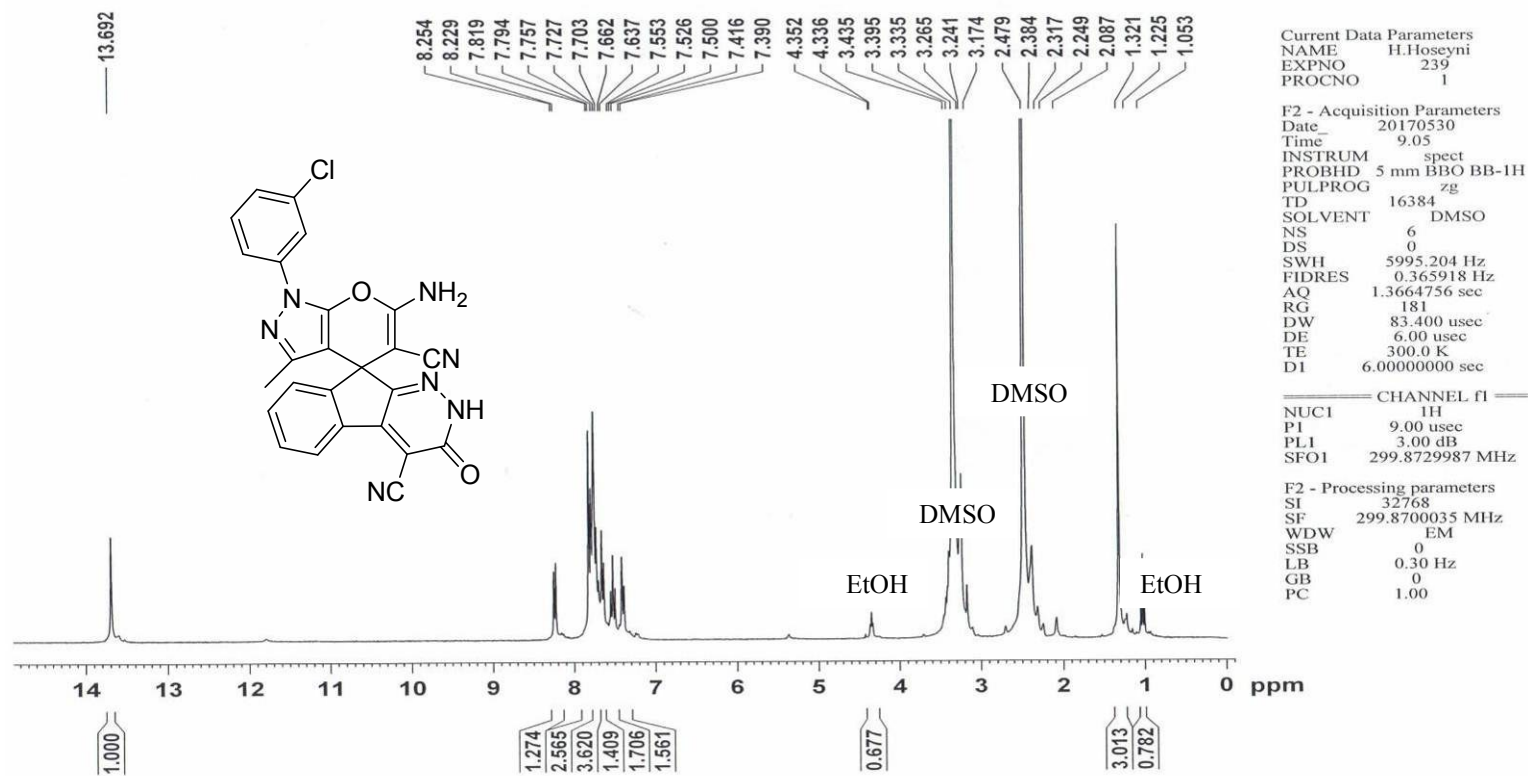
**¹³C NMR of 5f**

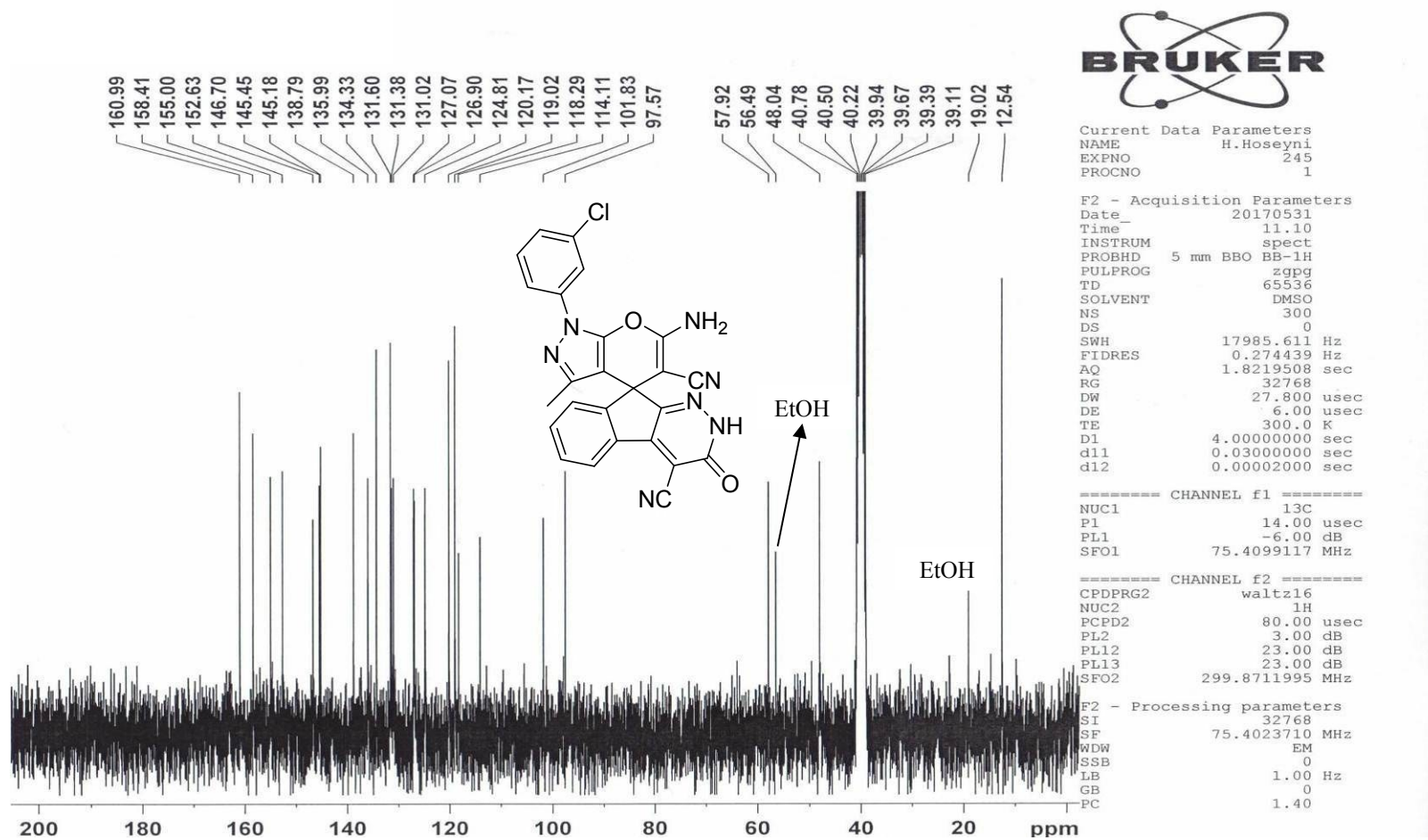


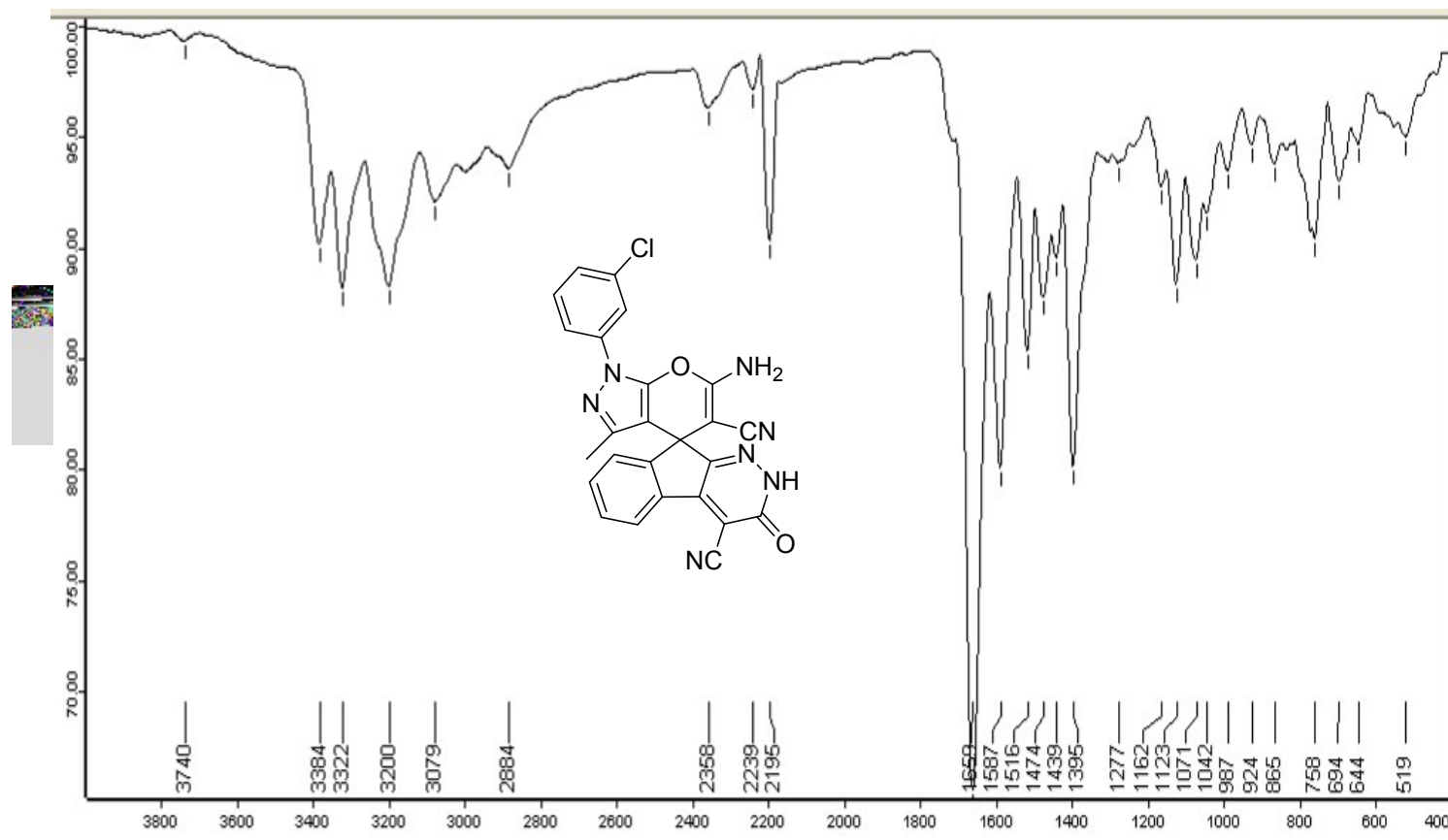
IR of 5f



MS of 5f

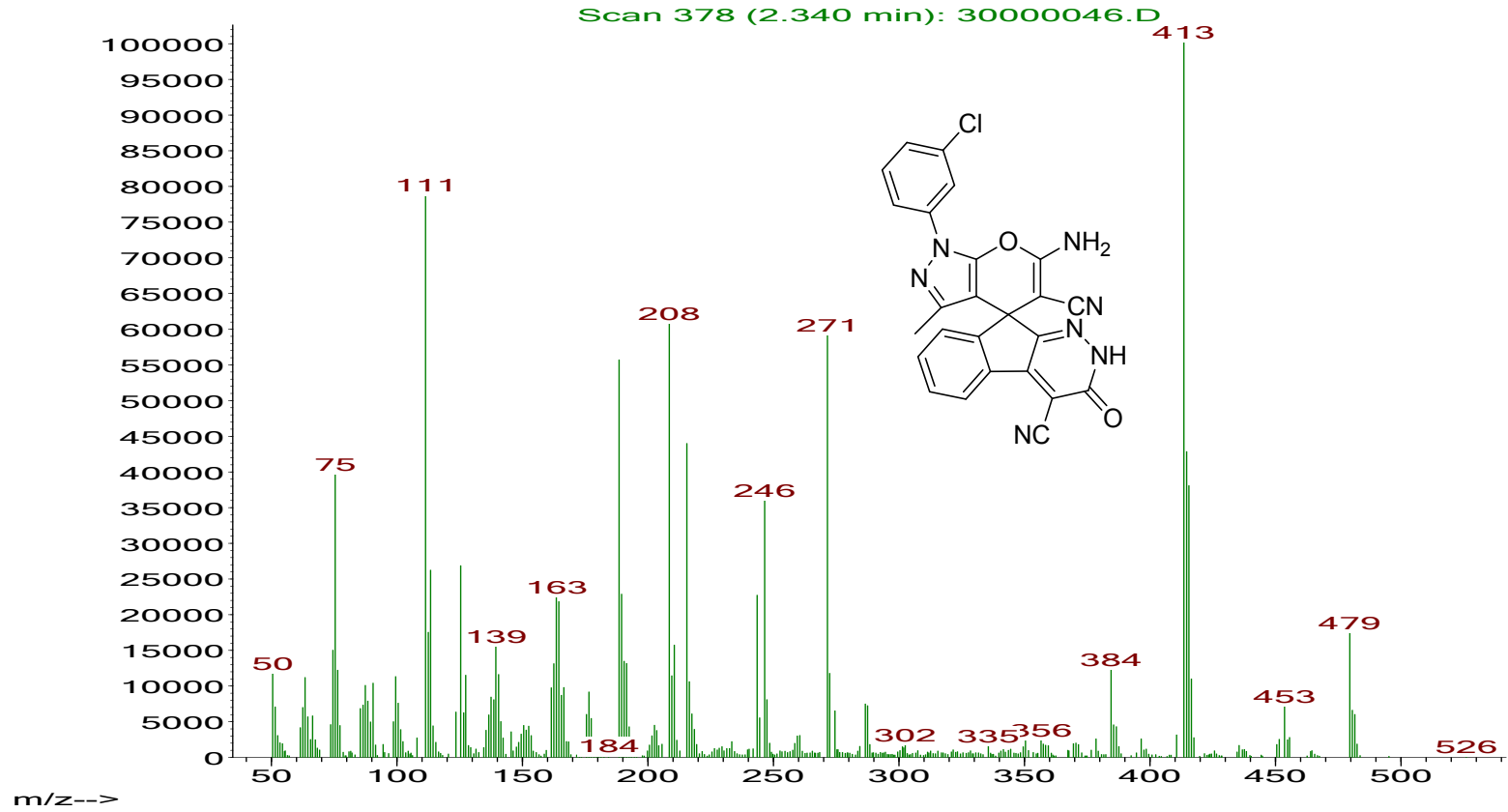




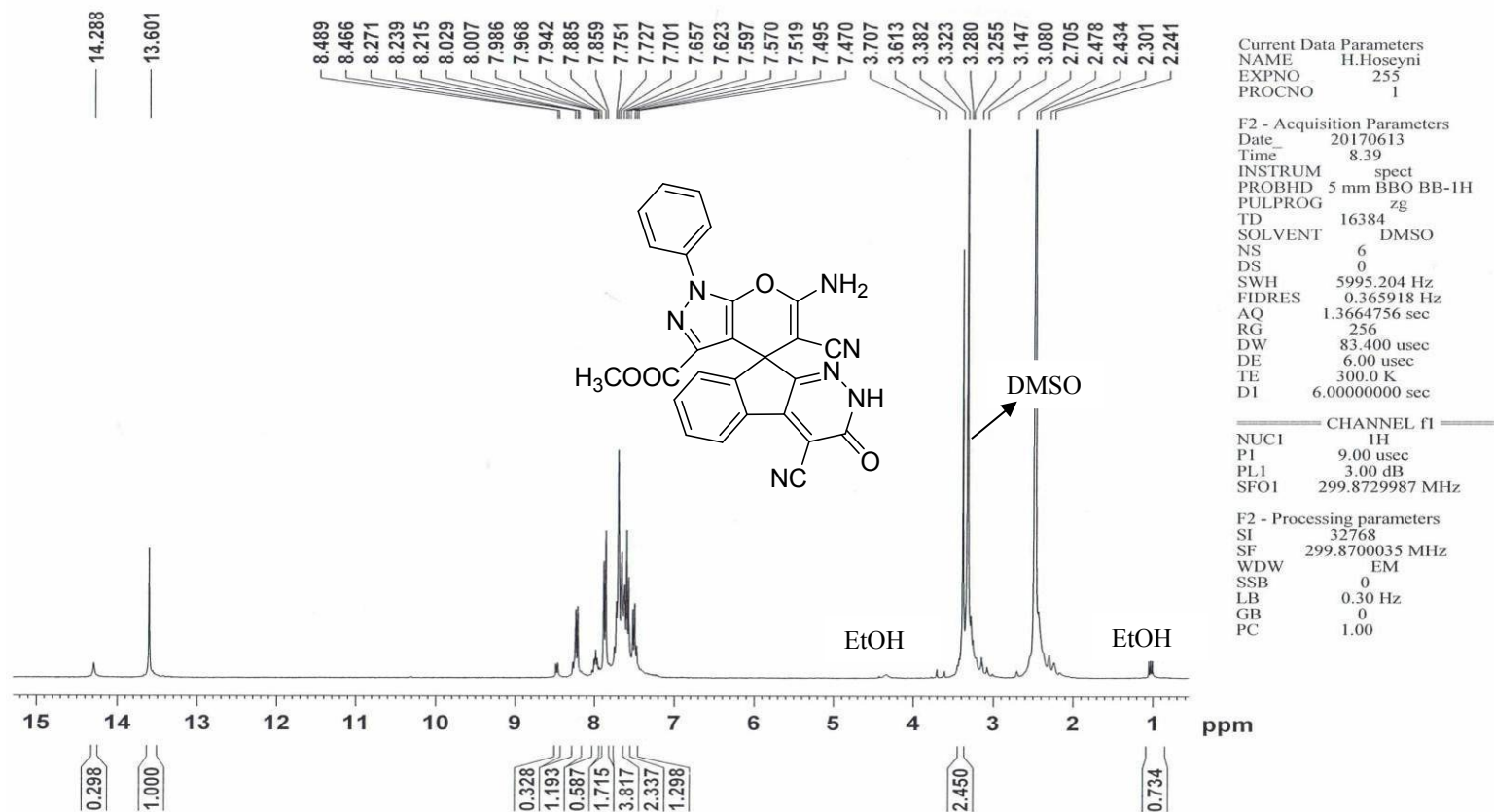


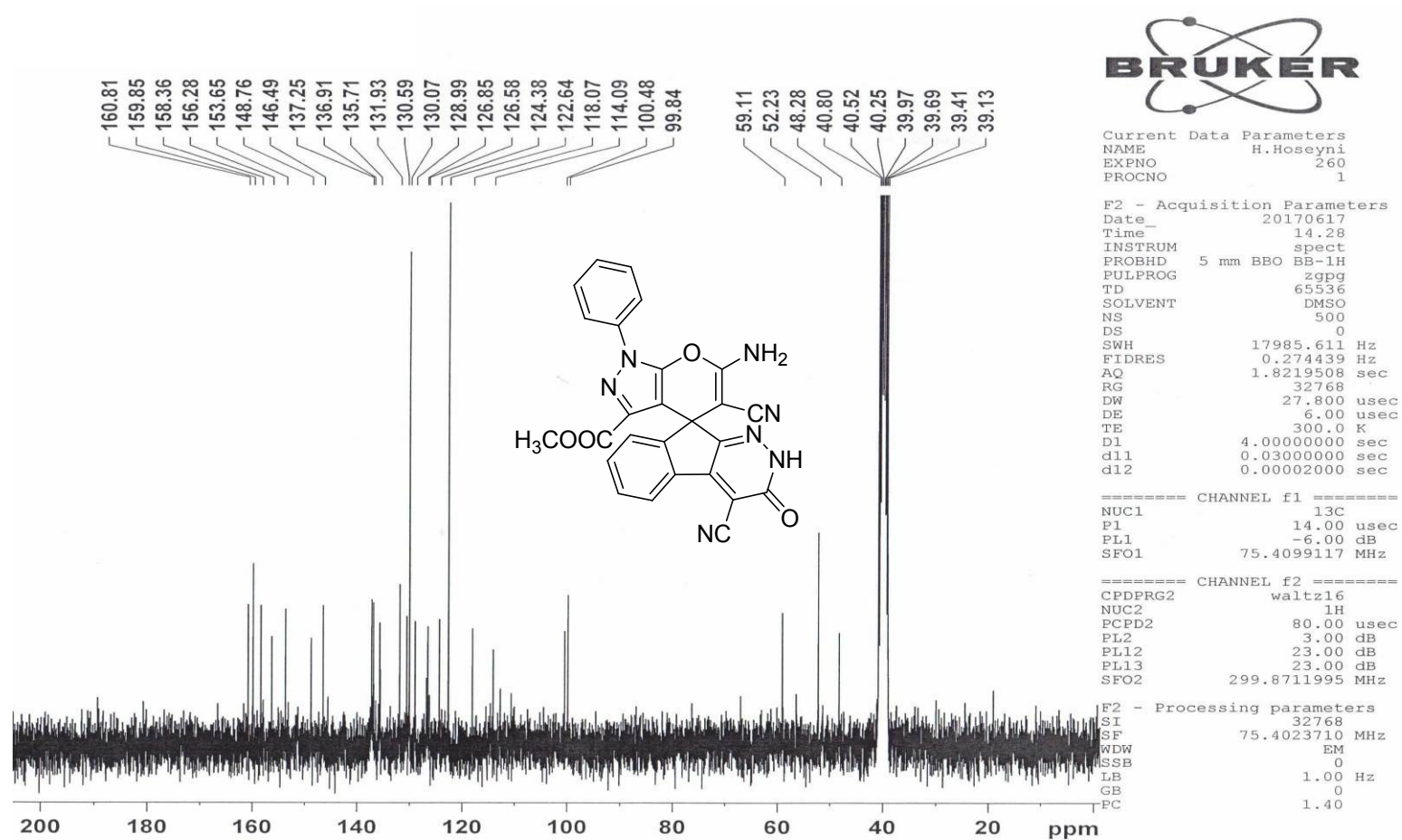
IR of 5g

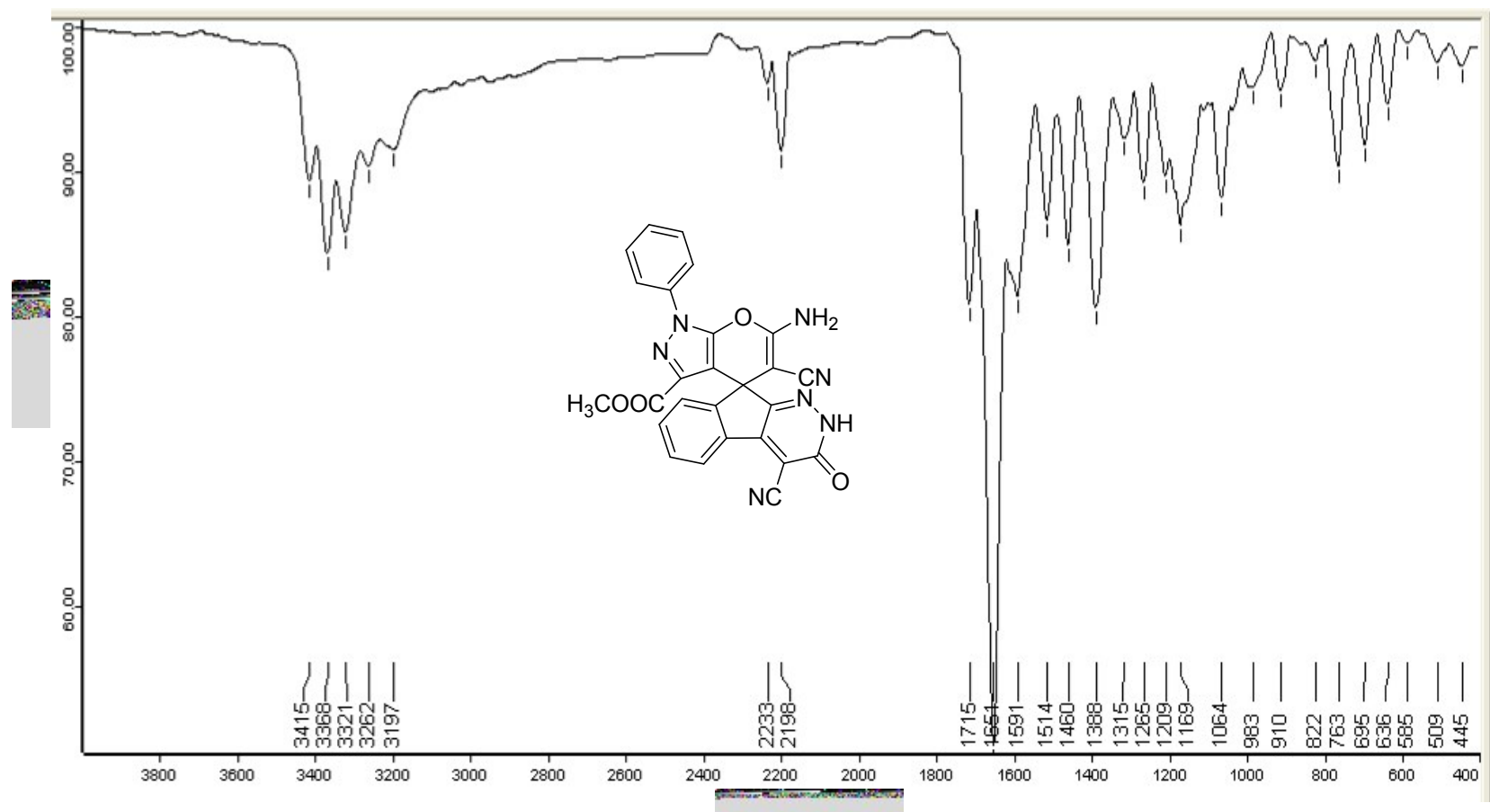
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MS of 5g

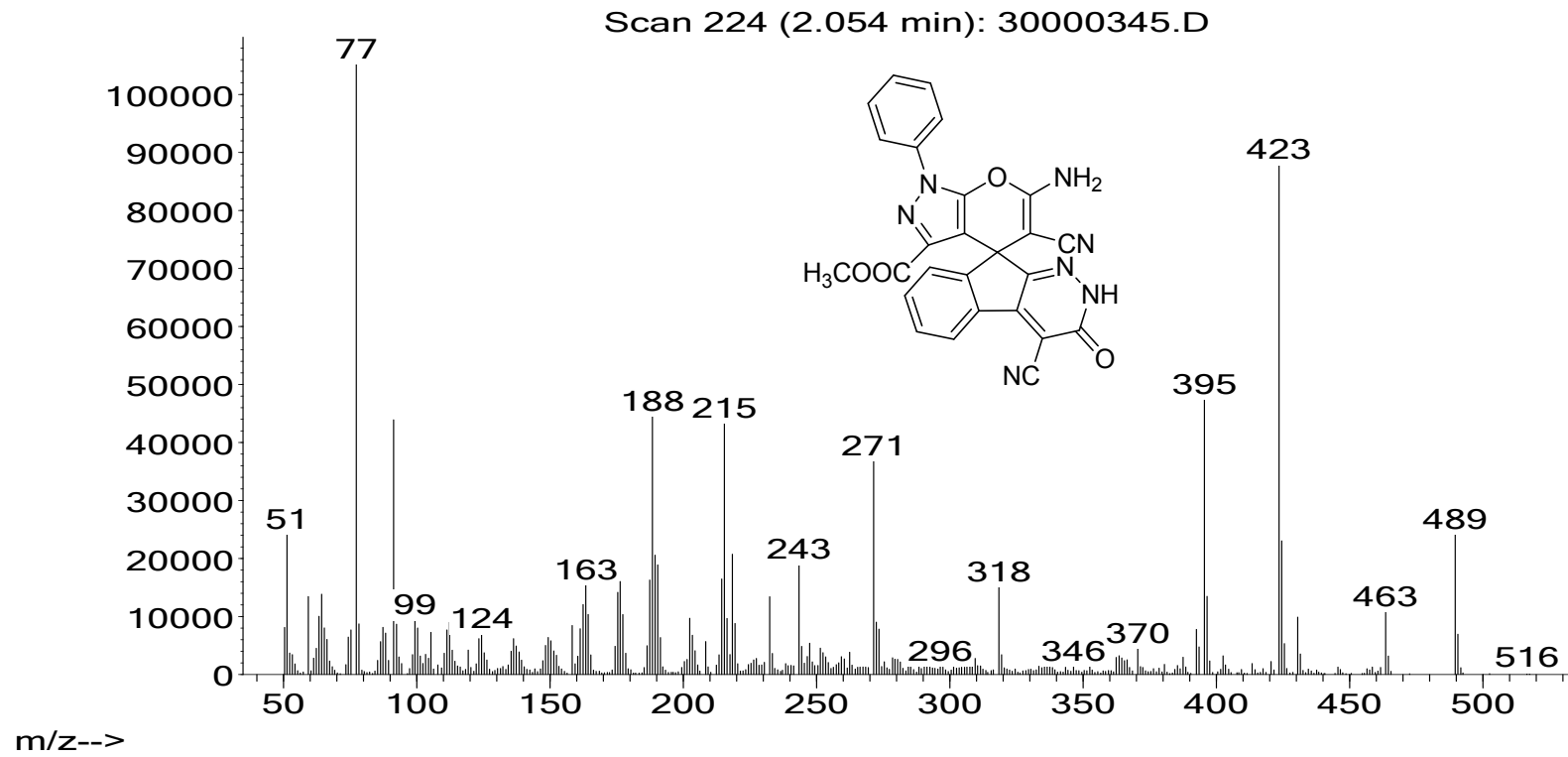


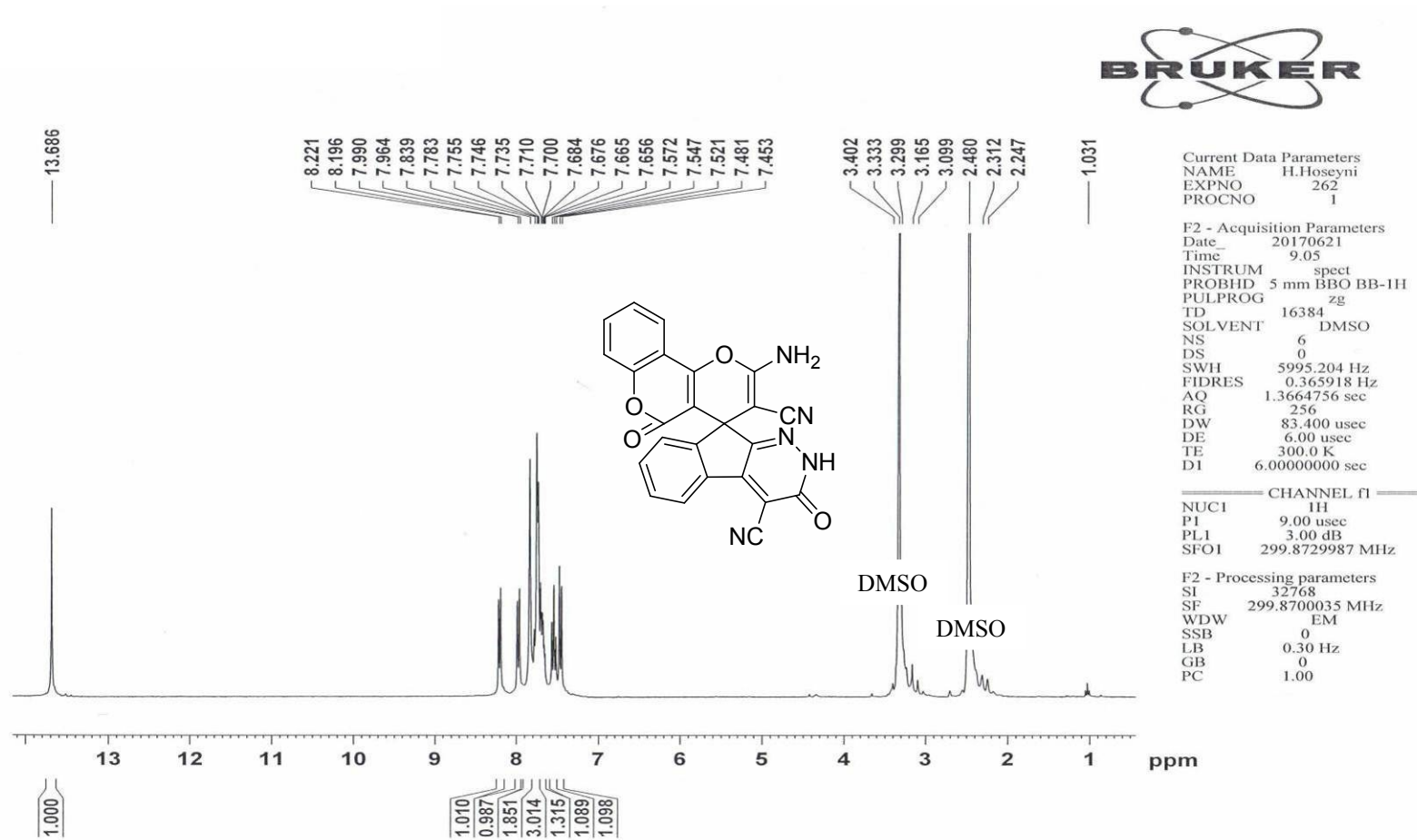


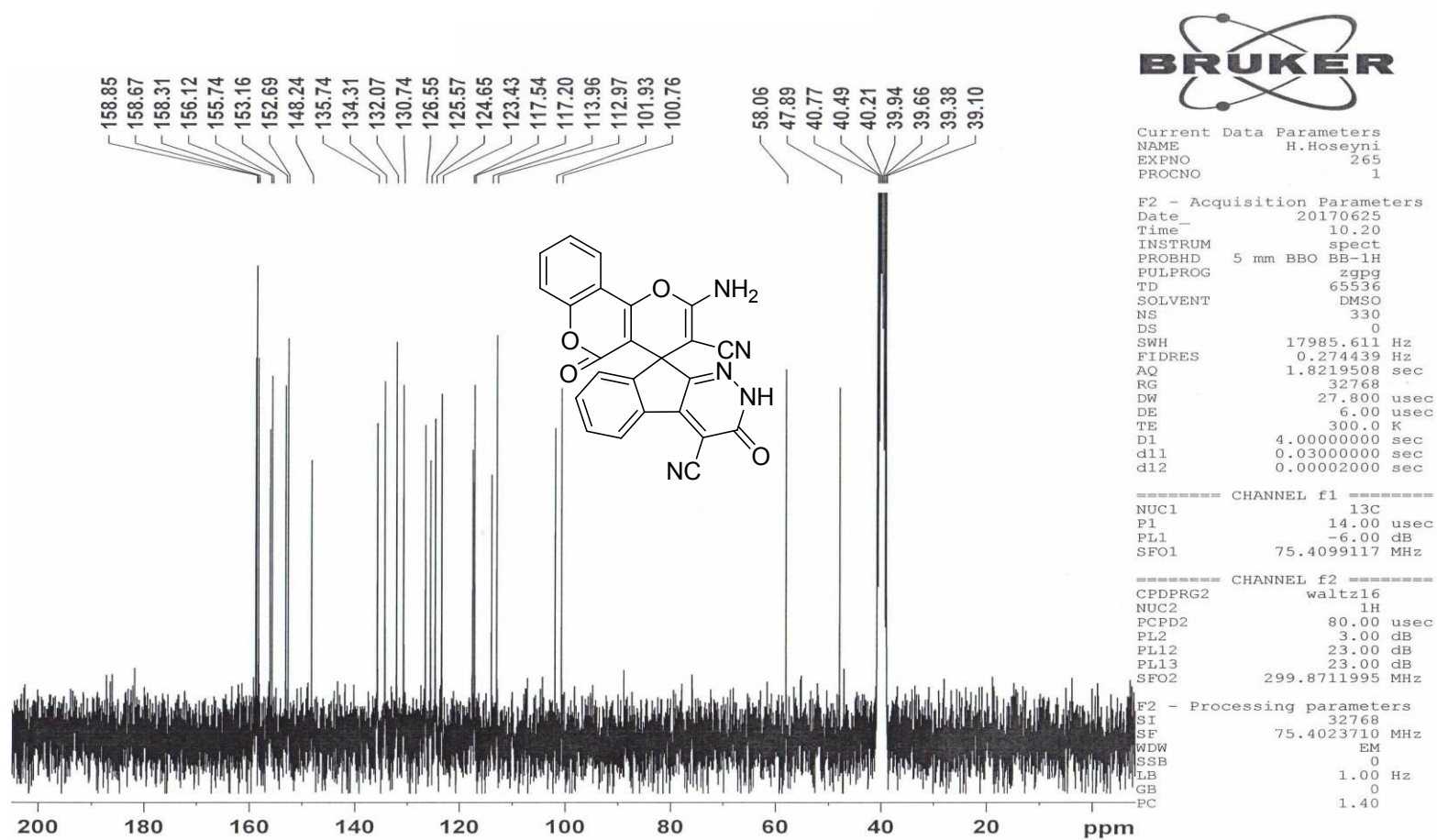


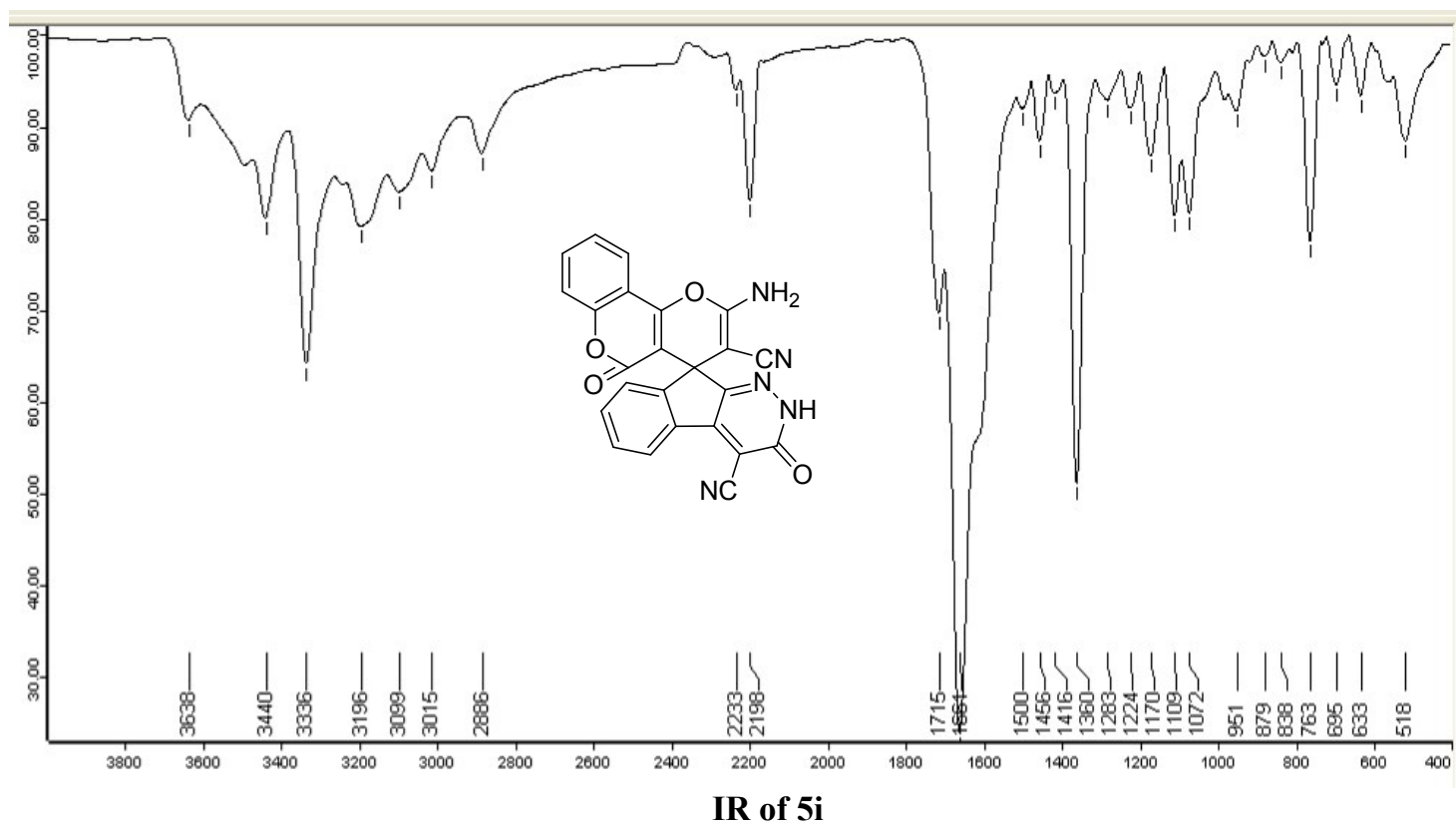
IR of 5h

Abundance

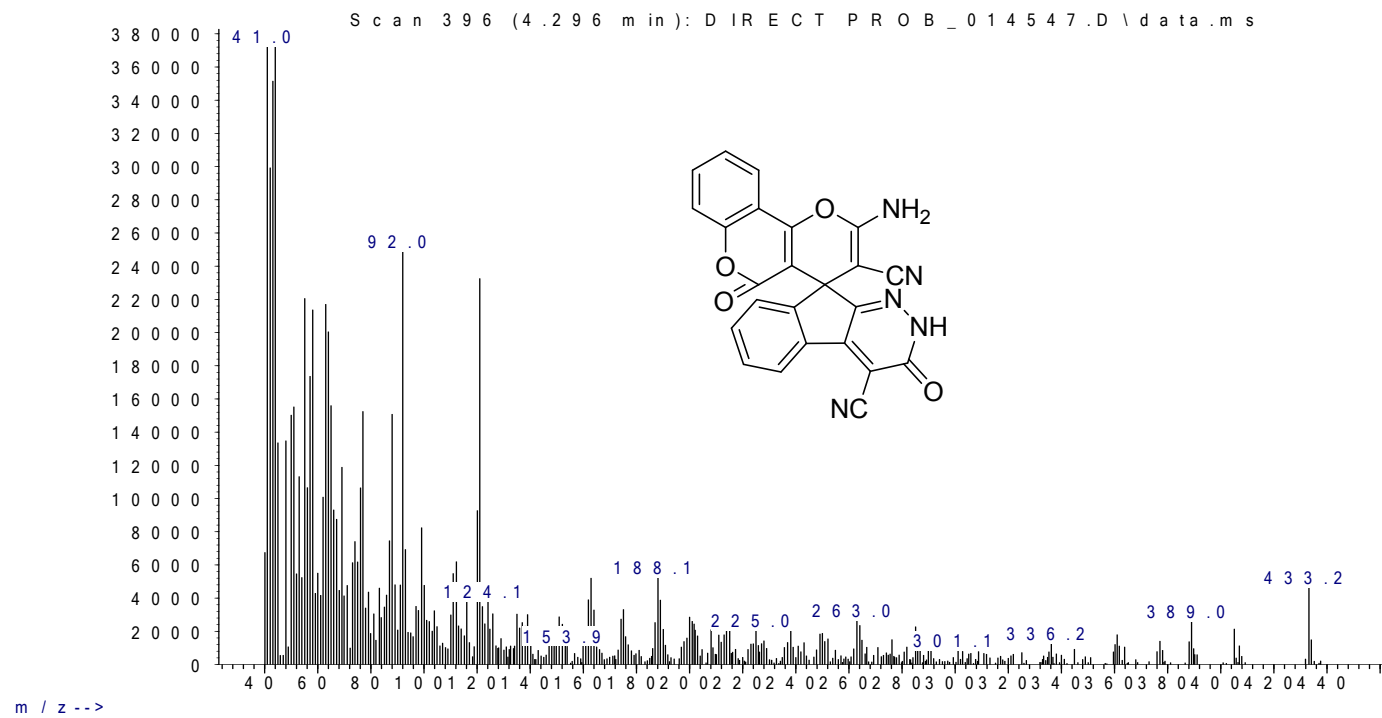


 ^1H NMR of 5i

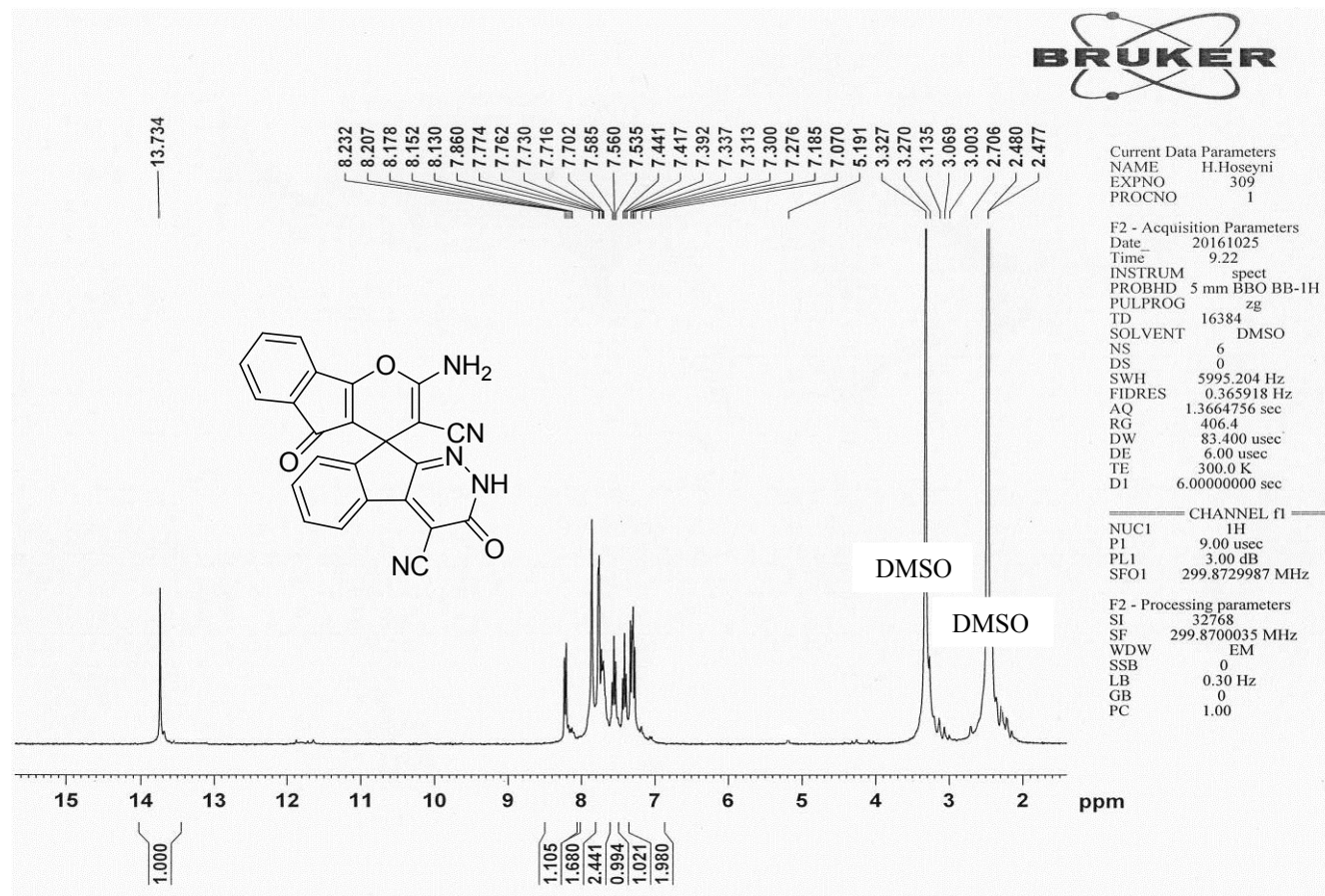
**¹³C NMR of 5i**



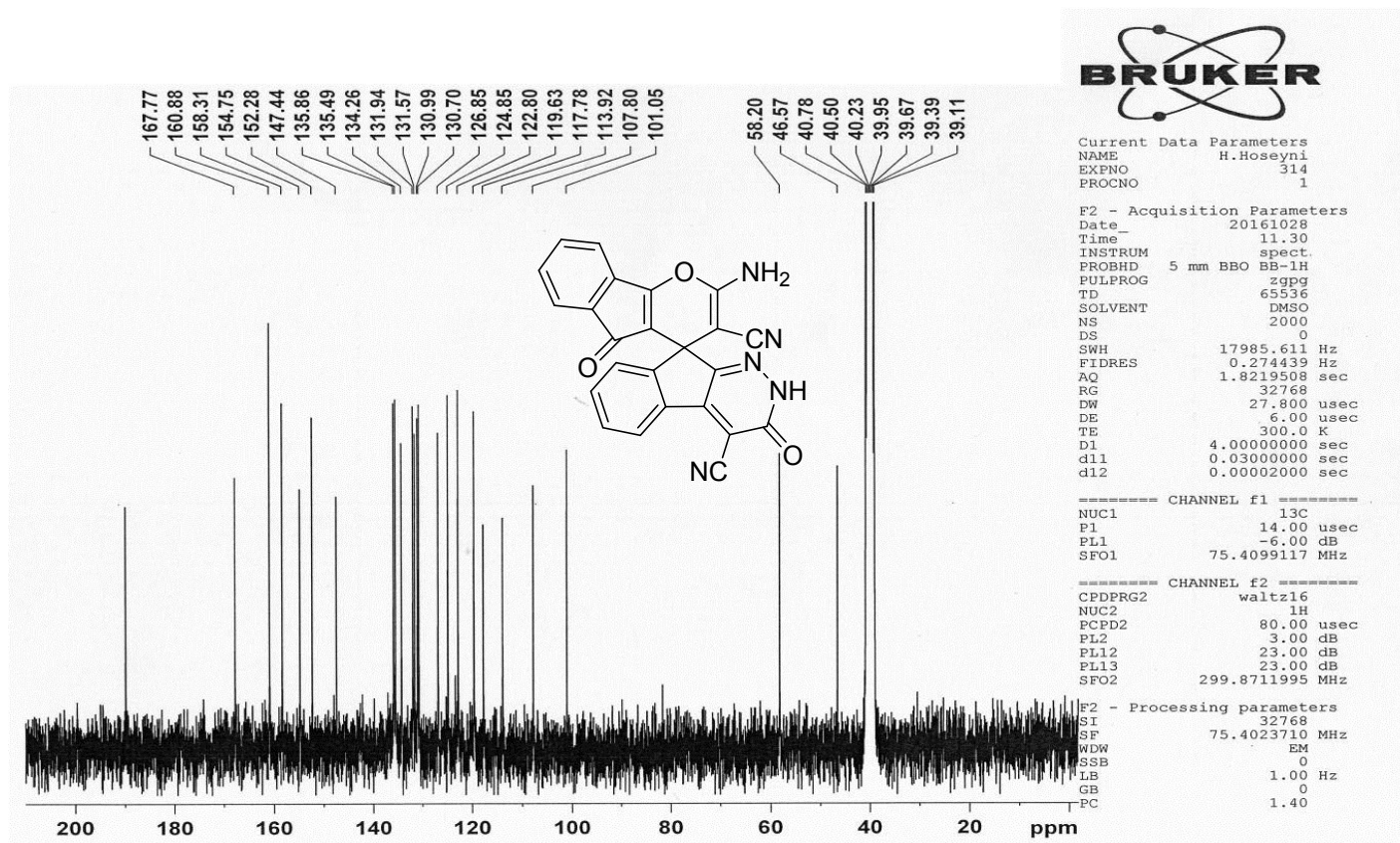
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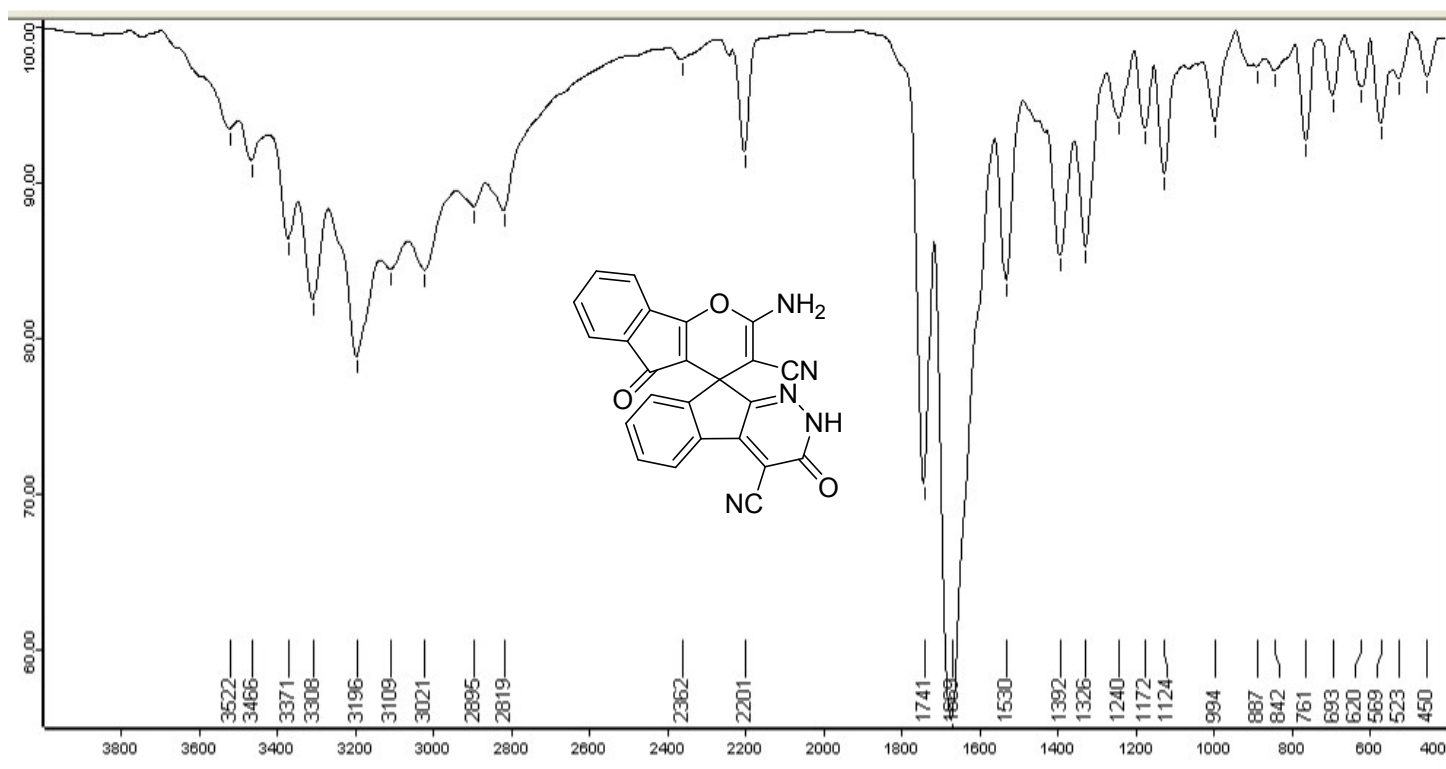


MS of 5i



¹H NMR of 5j

¹³C NMR of 5j



IR of 5j