

FIG. 1

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 1

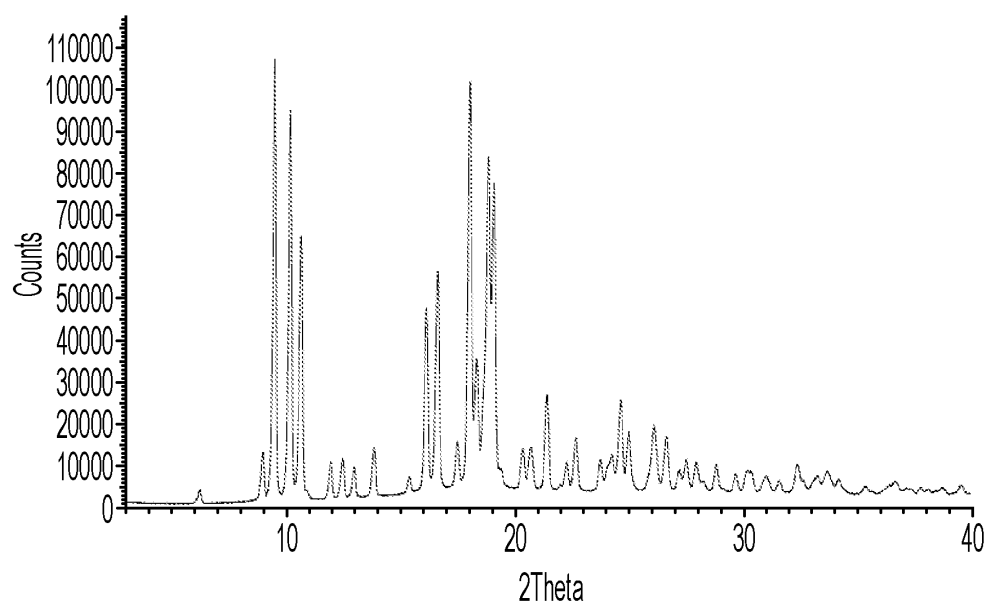


FIG. 2

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 5

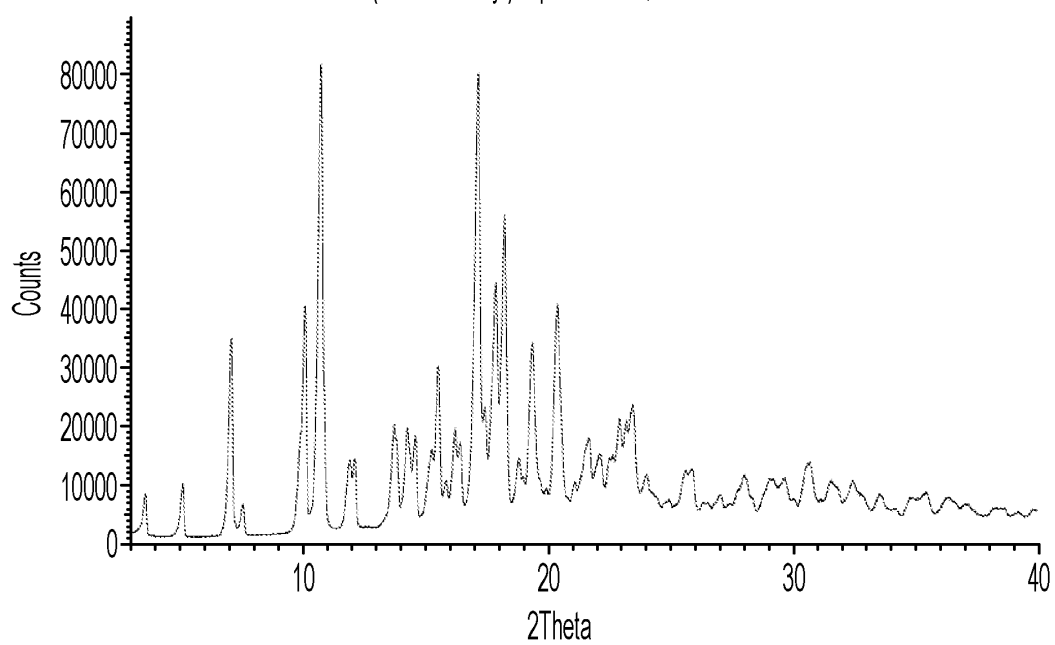


FIG. 3

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-((3S)-2-oxopyrrolidin-3-yl)ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether (CPME) solvate, Form 9

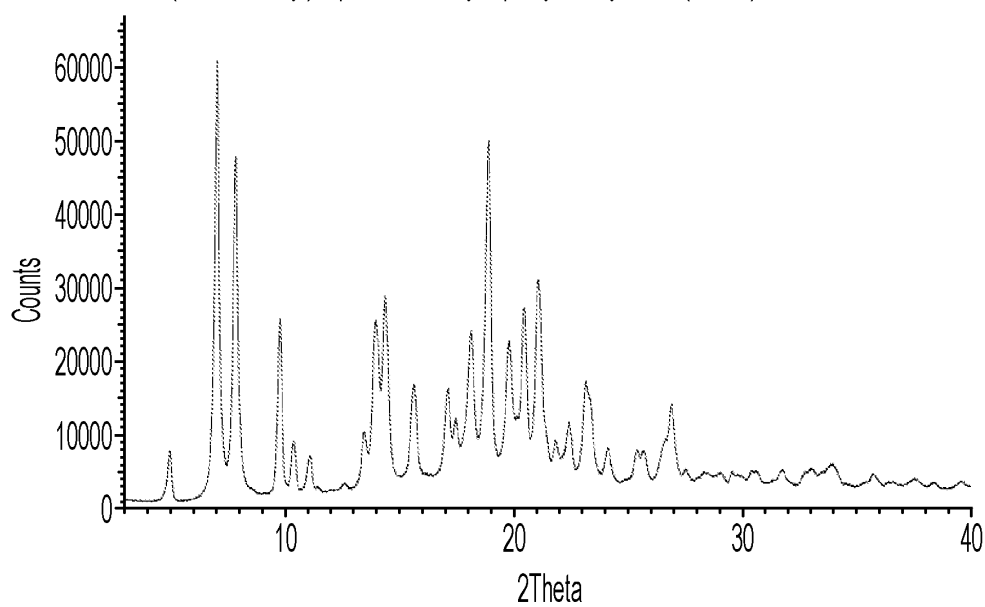


FIG. 4

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, amorphous free form, Form 10

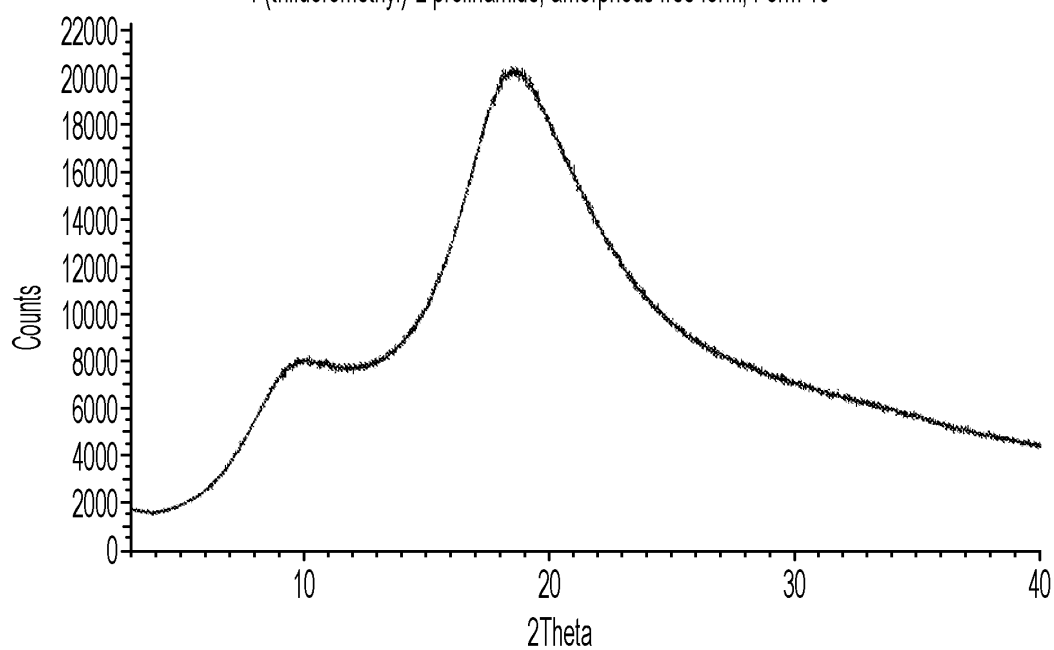


FIG. 5

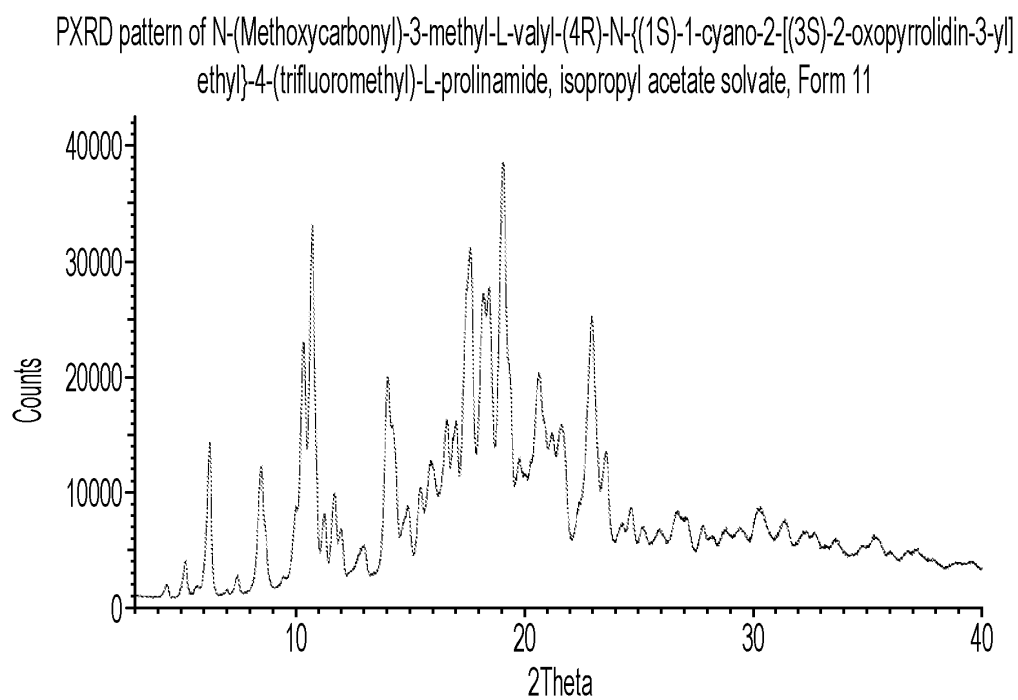


FIG. 6

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-((3S)-2-oxopyrrolidin-3-yl)ethyl)-4-(trifluoromethyl)-L-prolinamide, 750mg/g SDD

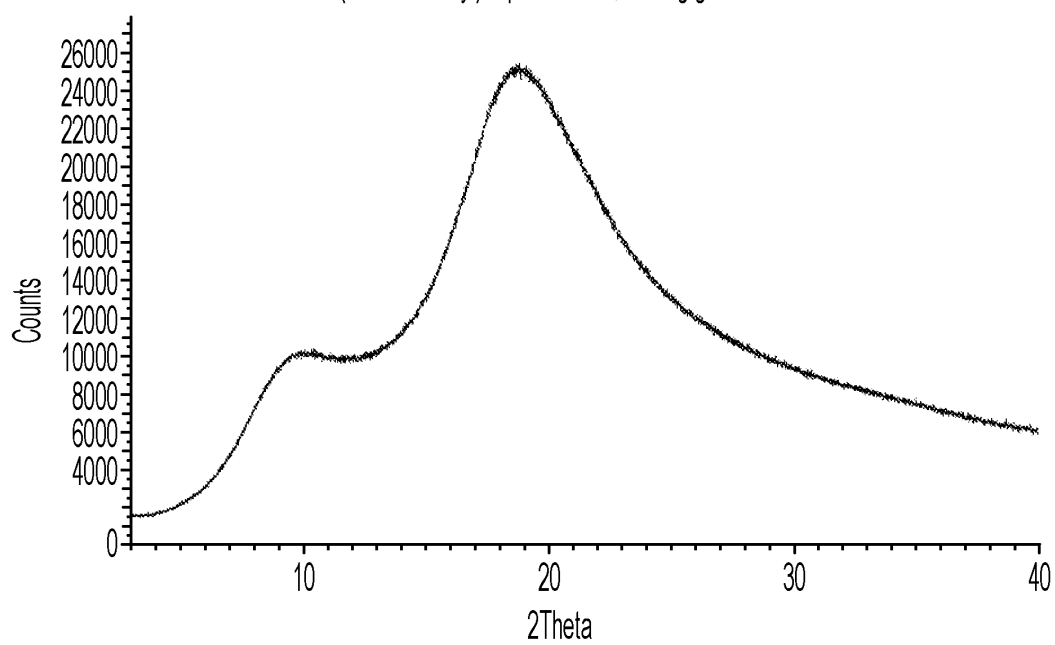


FIG. 7

ORTEP diagram (color) drawn with displacement parameters at 50% for N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-[(1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl]-4-(trifluoromethyl)-L-prolinamide Form 1 asymmetric unit

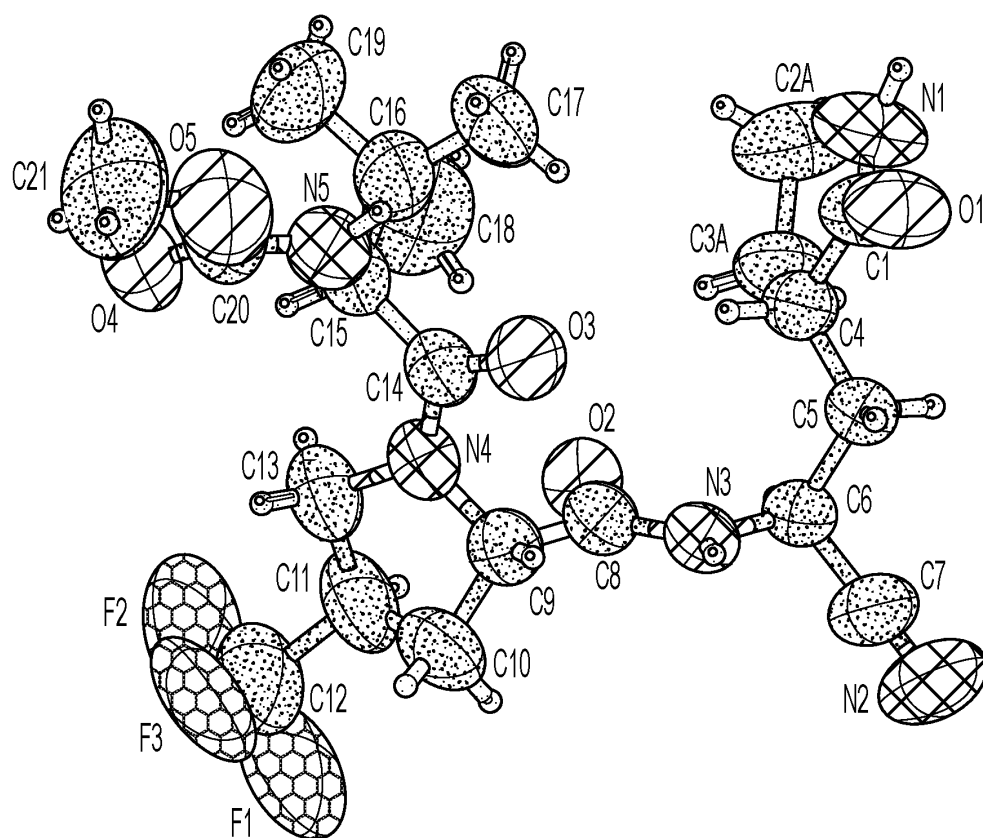


FIG. 8

Calculated powder pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 1

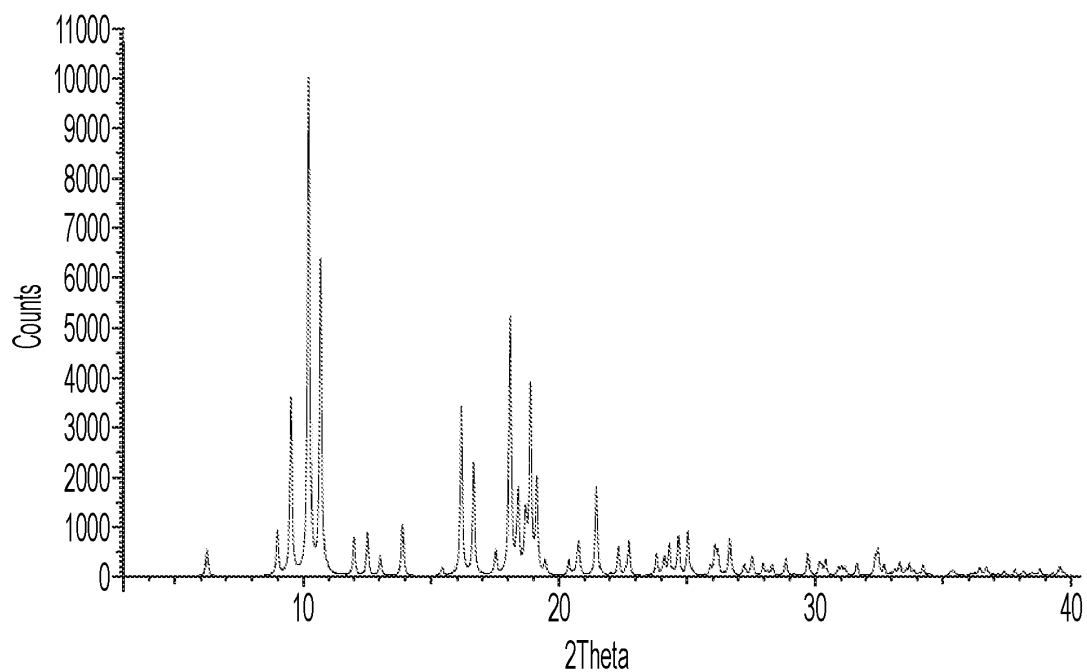


FIG. 9

ORTEP diagram (color) drawn with displacement parameters at 50% for Form 5 asymmetric unit

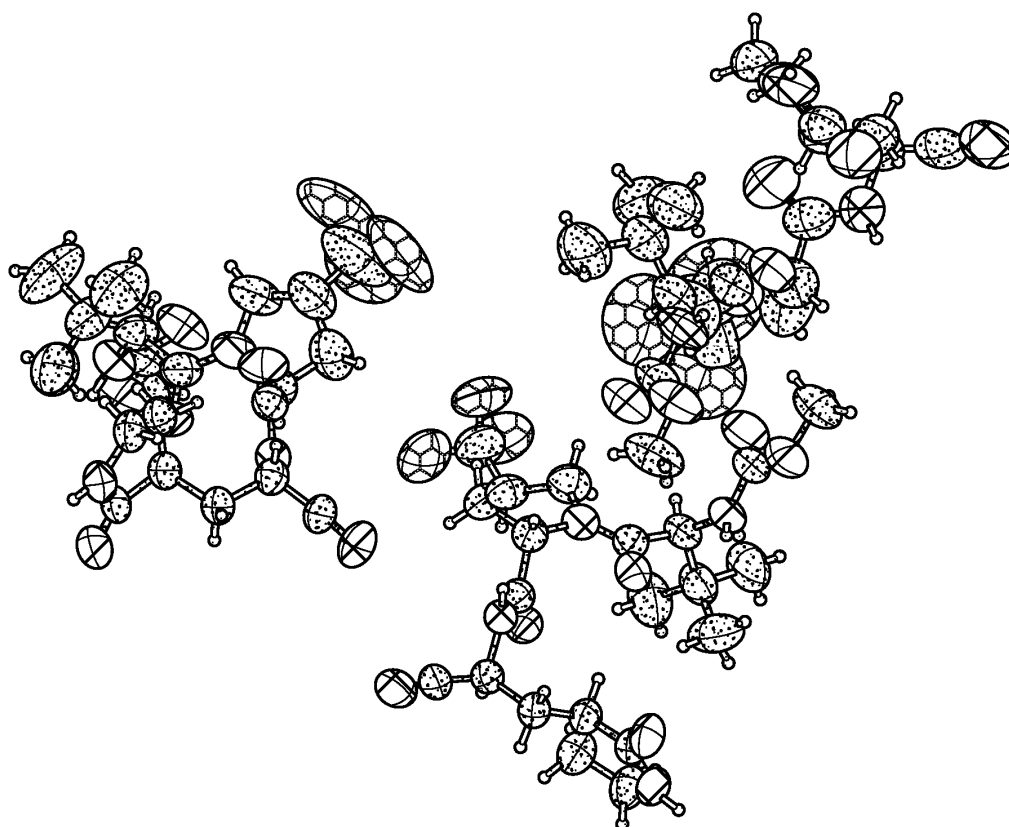


FIG. 10

Calculated powder pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 5 anhydrous free form

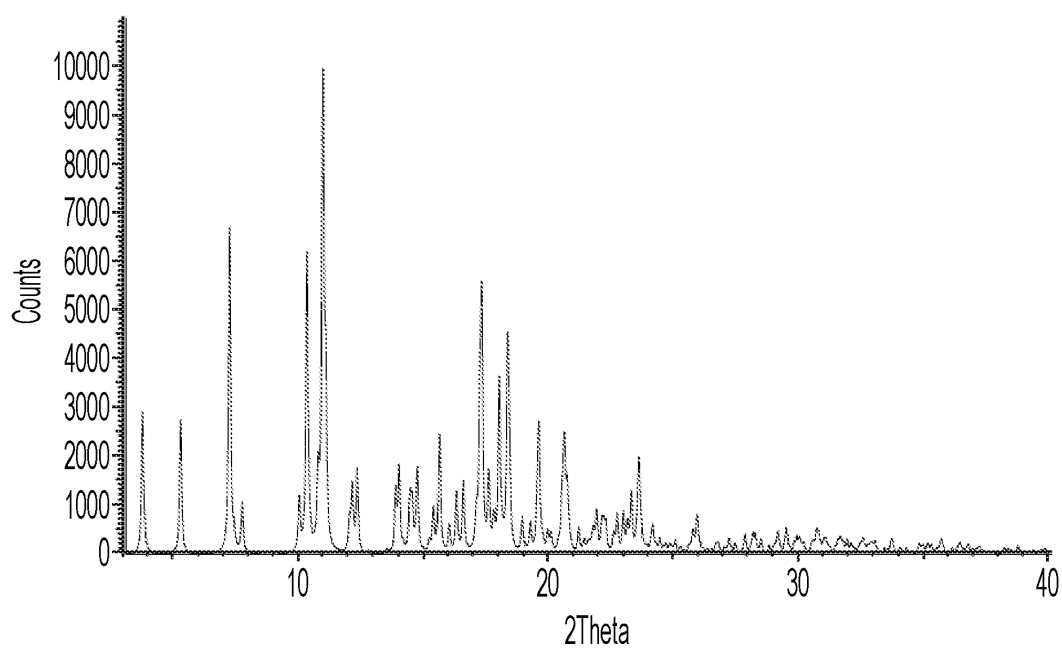


FIG. 11

ORTEP diagram (color) drawn with displacement parameters at 50% for N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-[(1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl]-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 8 asymmetric unit

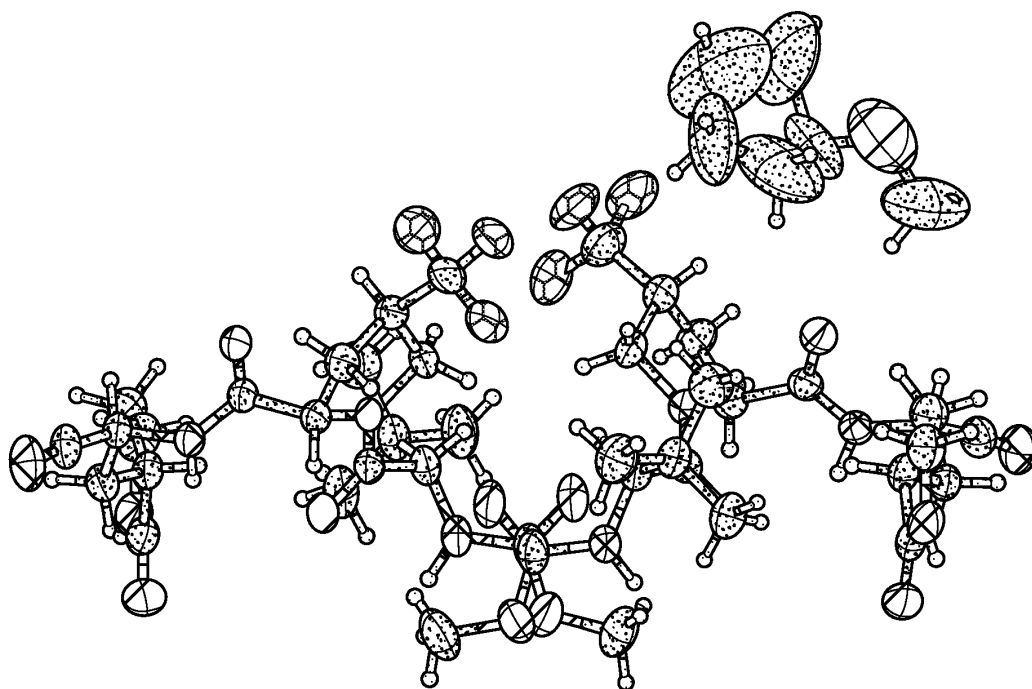


FIG. 12

Calculated powder pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 8

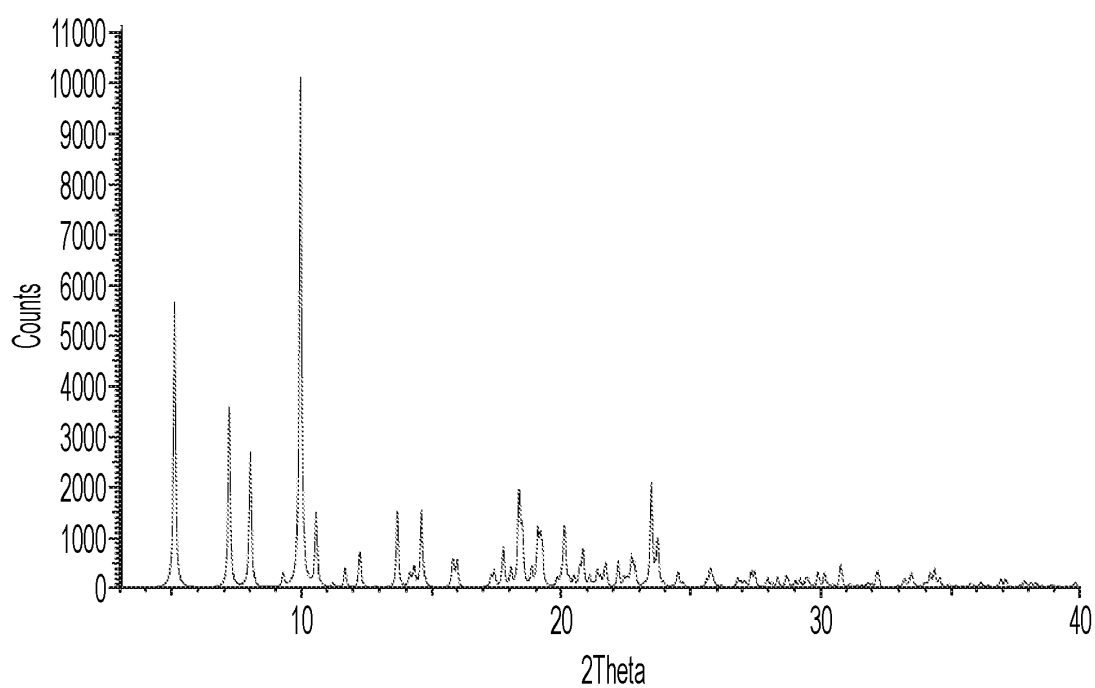


FIG. 13

Representative molecule N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 12 from the asymmetric unit with anisotropic displacement parameters drawn at 50% probability and absolute configuration assignments calculated in PLATON. The other molecule in the asymmetric unit is labeled with analogous naming scheme

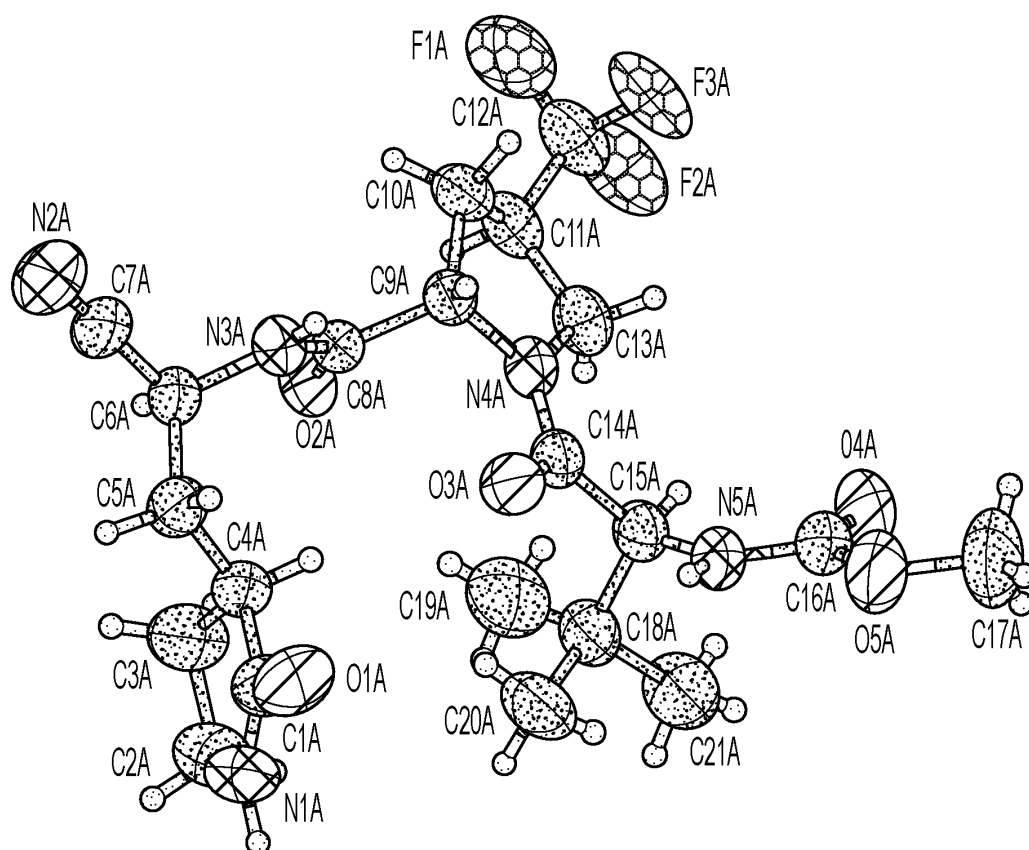


FIG. 14

Calculated powder pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 12

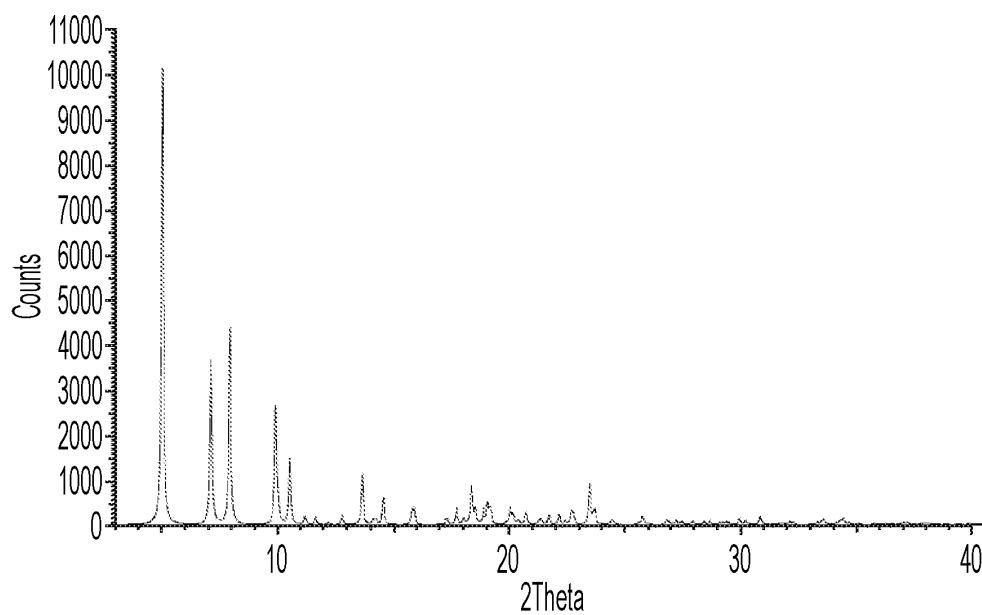


FIG. 15

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide Form 1. The peaks marked by hashes are spinning side bands

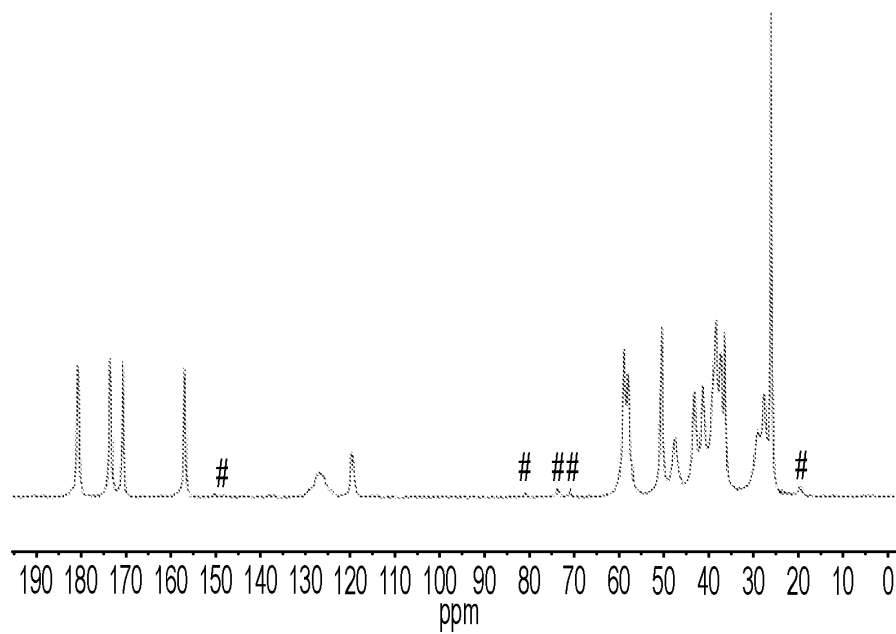


FIG. 16

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide Form 1. The peaks marked by hashes are spinning side bands

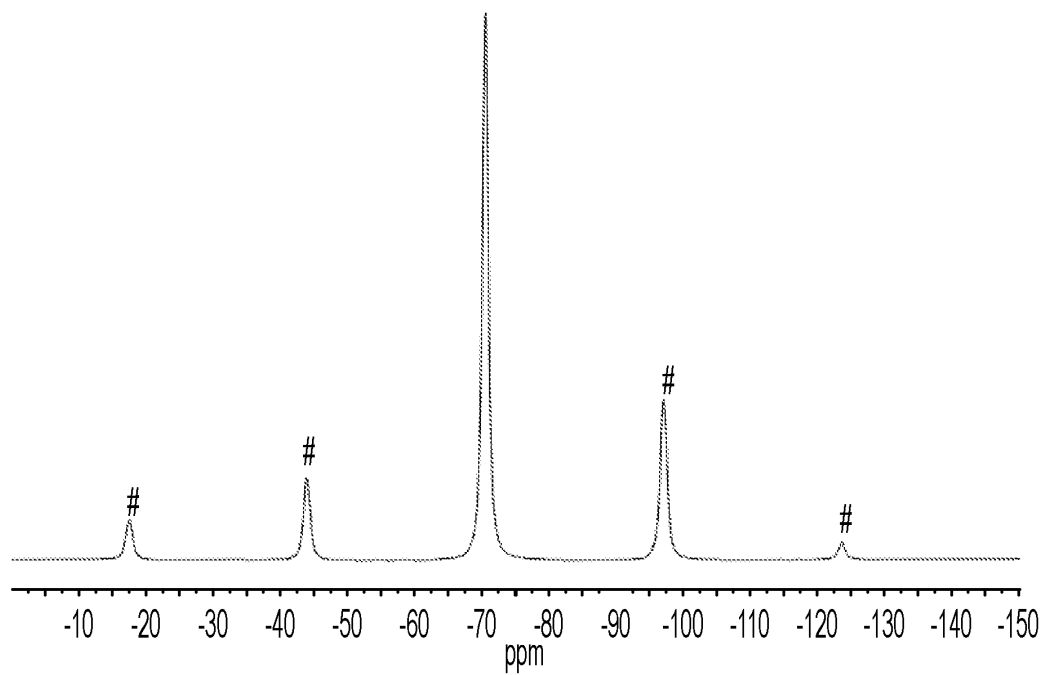


FIG. 17

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 5. The peaks marked by hashes are spinning side bands

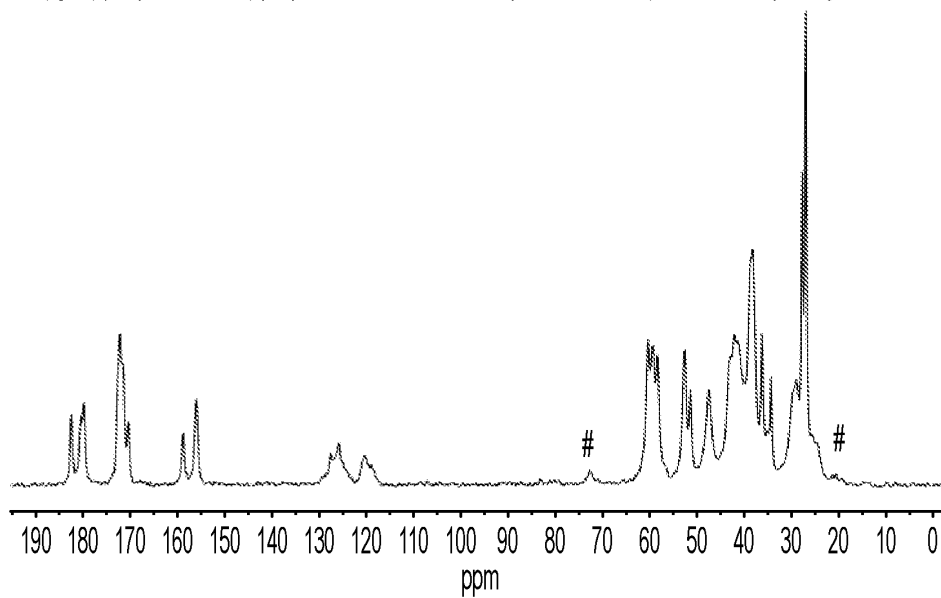


FIG. 18

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 5.

The peaks marked by hashes are spinning side bands

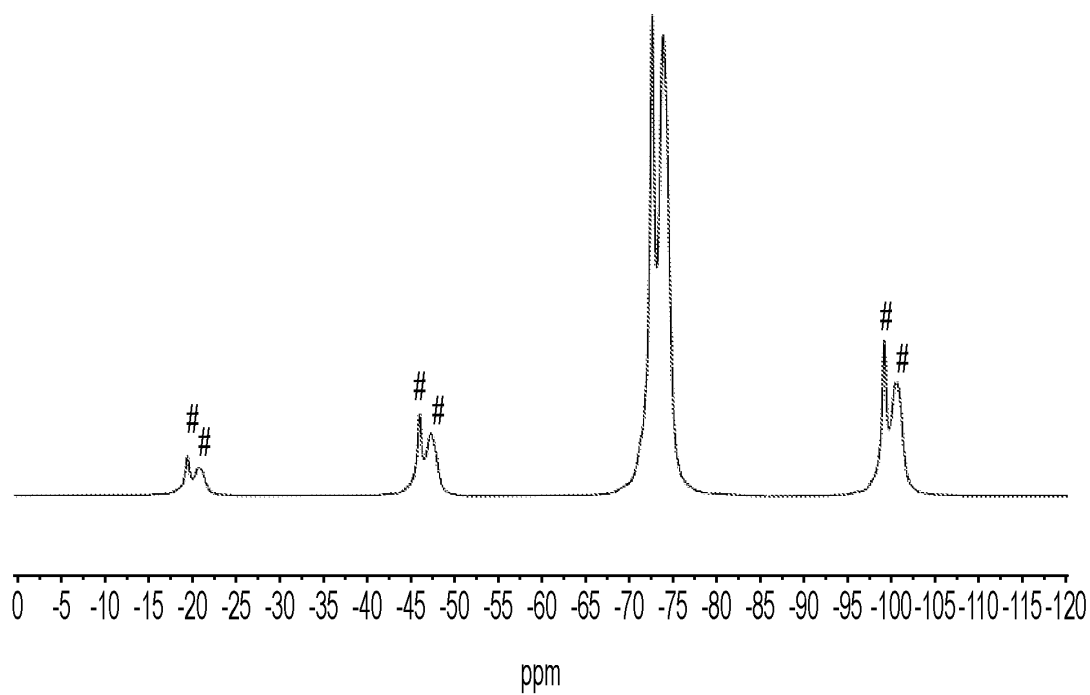


FIG. 19

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate Form 9. The peaks marked by hashes are spinning side bands

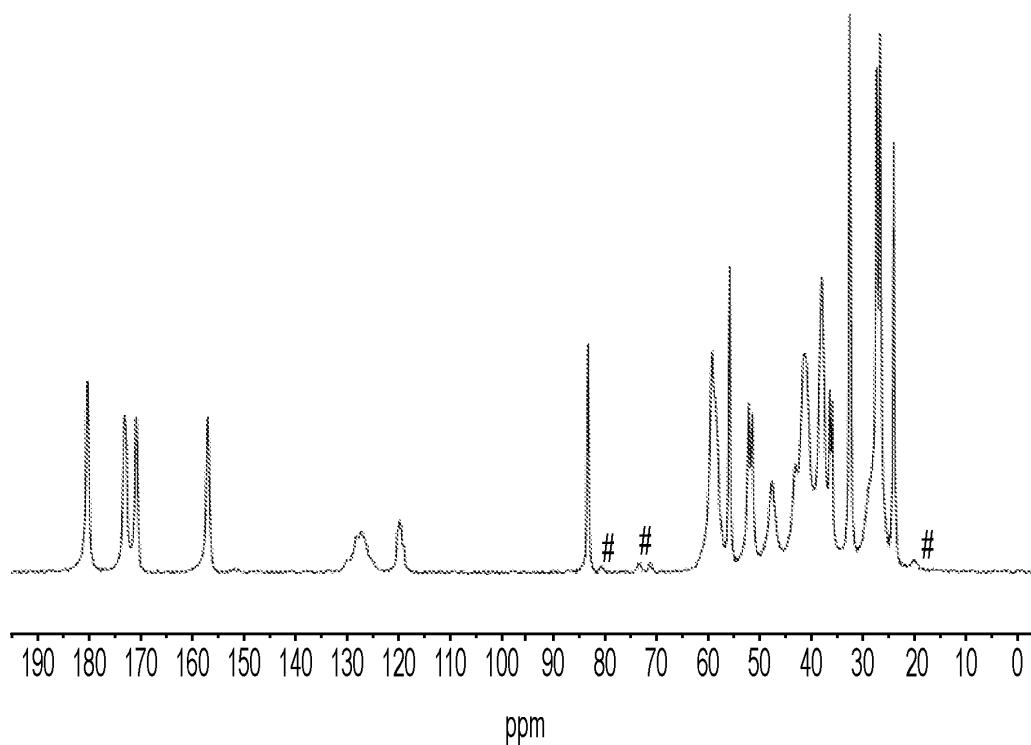


FIG. 20

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 9. The peaks marked by hashes are spinning side bands

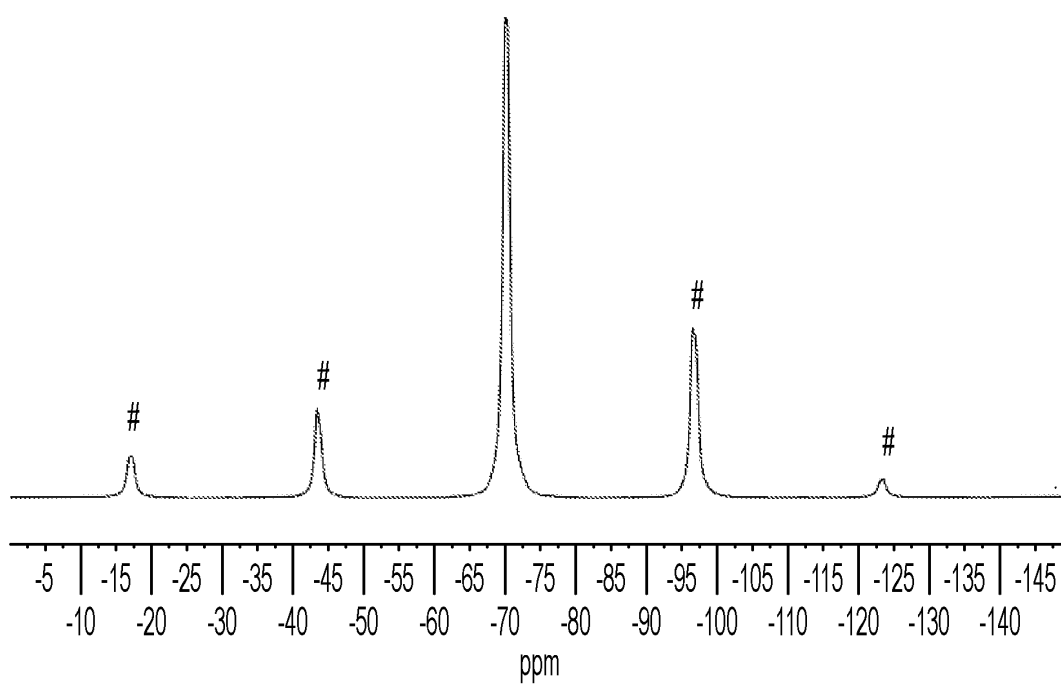


FIG. 21

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-((3S)-2-oxopyrrolidin-3-yl)ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 10. The peaks marked by hashes are spinning side bands

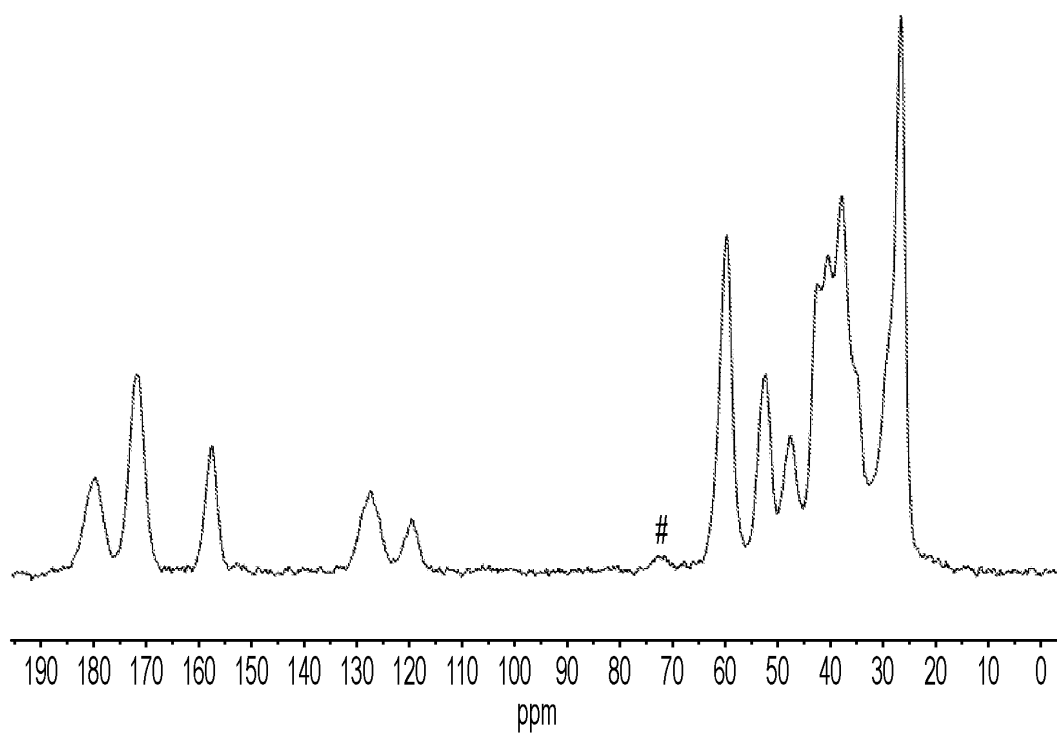


FIG. 22

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, amorphous free form, Form 10. The peaks marked by hashes are spinning side bands

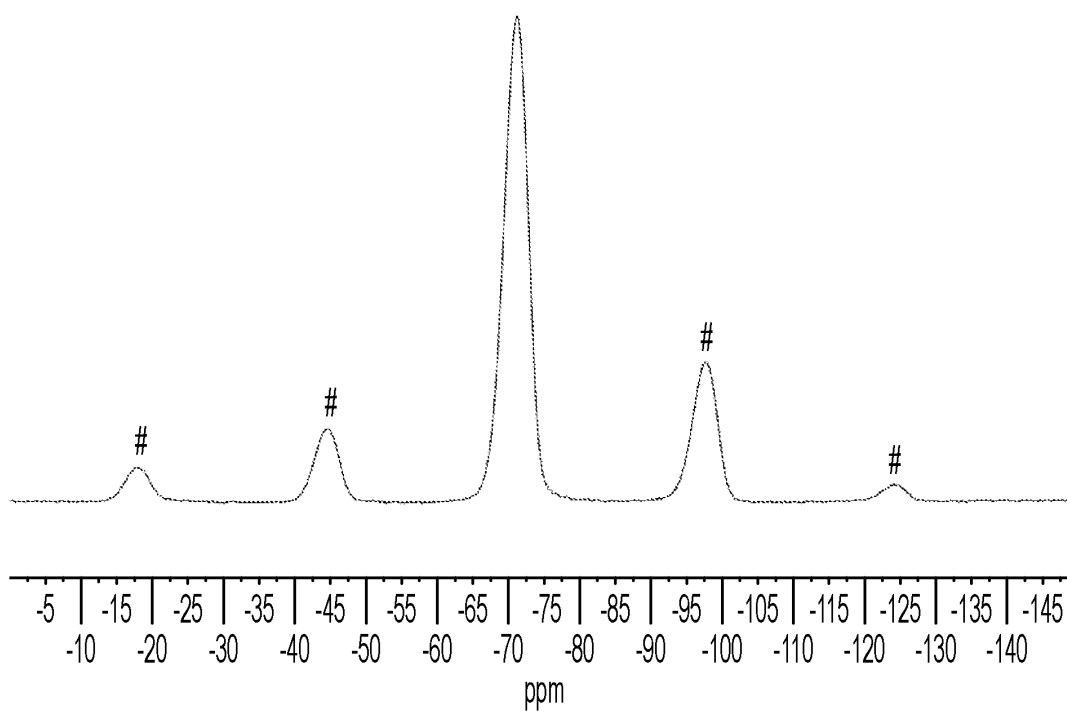


FIG. 23

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 11.
The peaks marked by hashes are spinning side bands

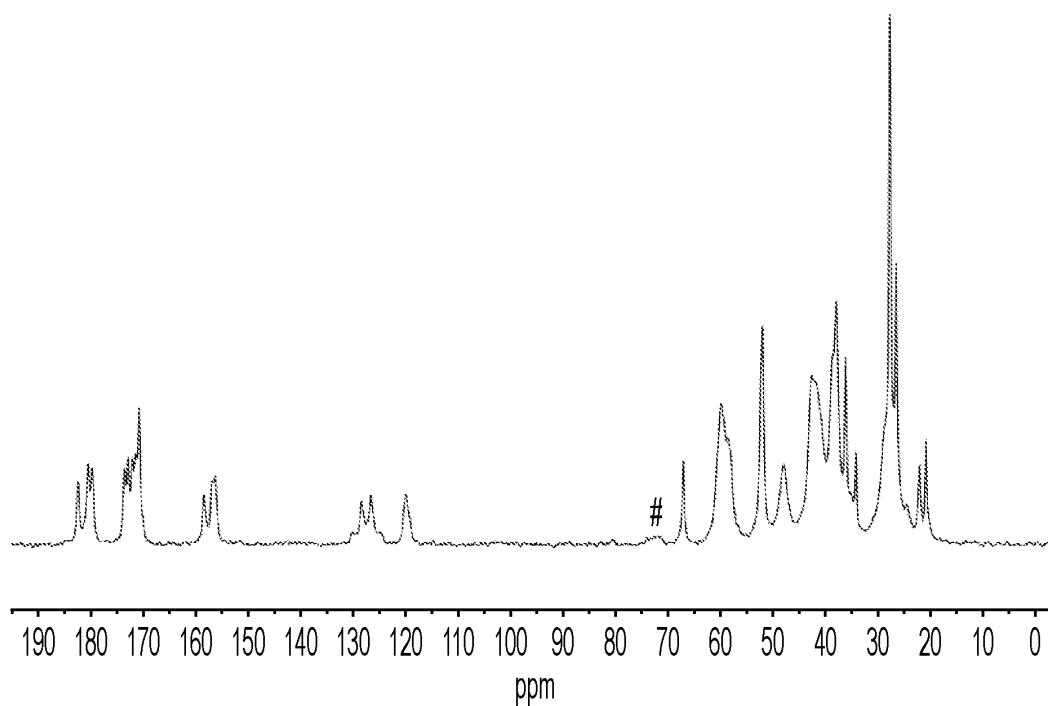


FIG. 24

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 11. The peaks marked by hashes are spinning side bands

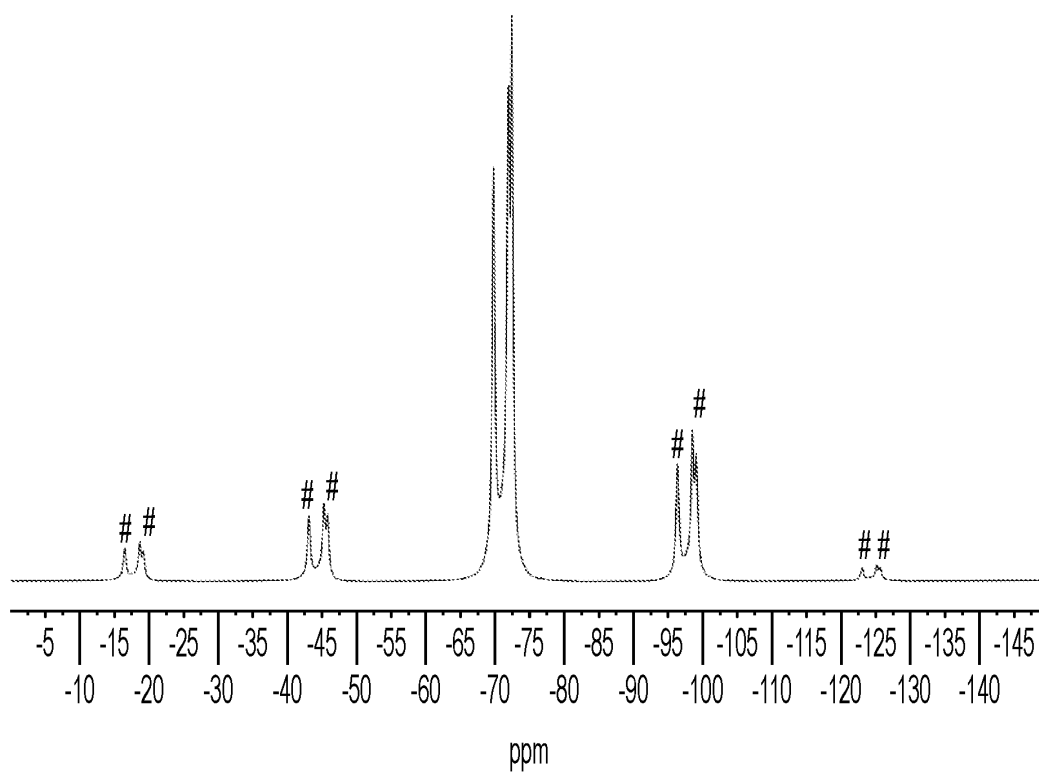


FIG. 25

^{13}C solid-state NMR spectrum of 750 mg/g SDD

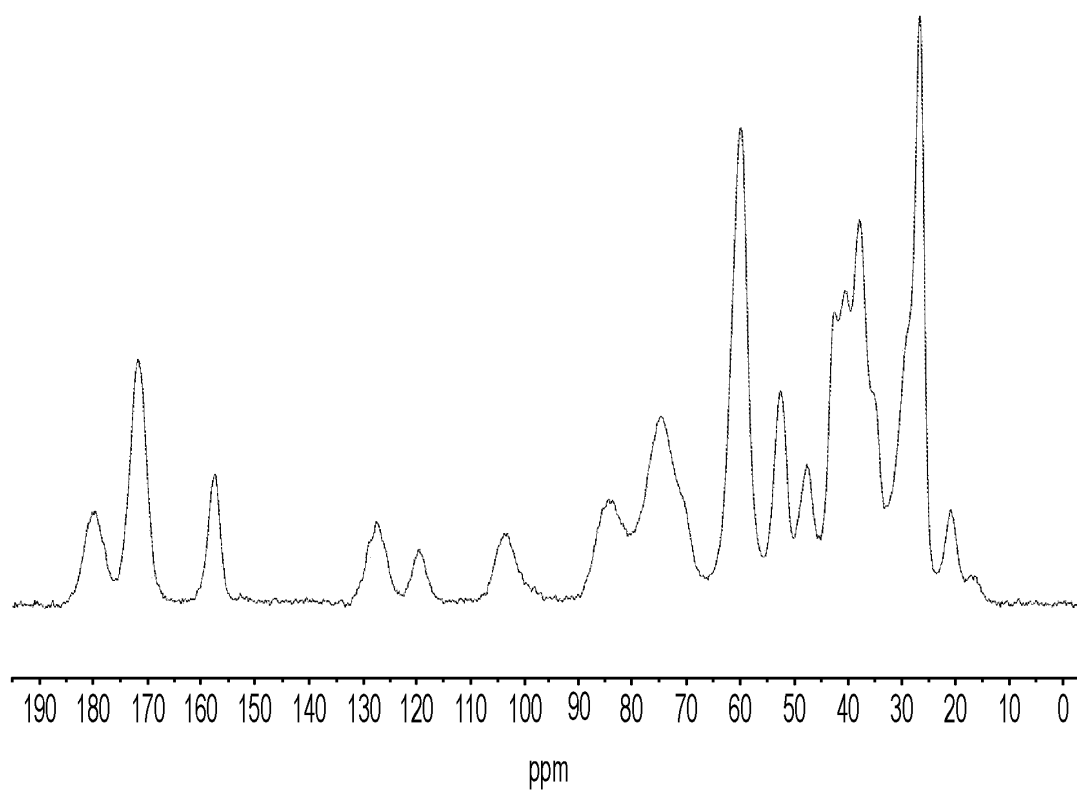


FIG. 26

^{19}F solid-state NMR spectrum of 750 mg/g SDD. The peaks marked by hashes are spinning side bands

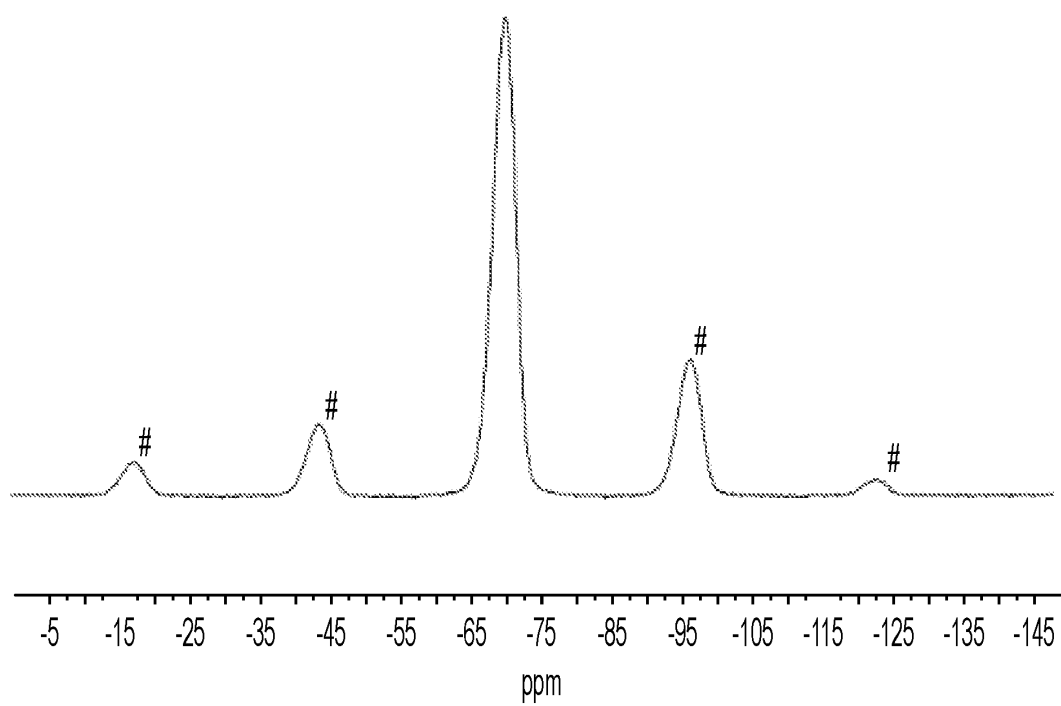


FIG. 27

TGA of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 9 (TGA-IR)

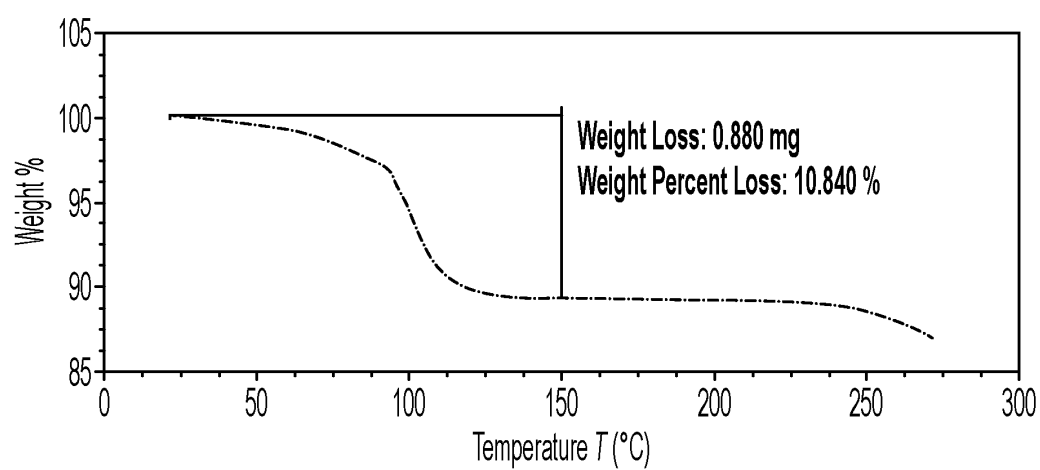


FIG. 28

Gram-Schmidt and IR of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 9 (TGA-IR) at 9.056 min

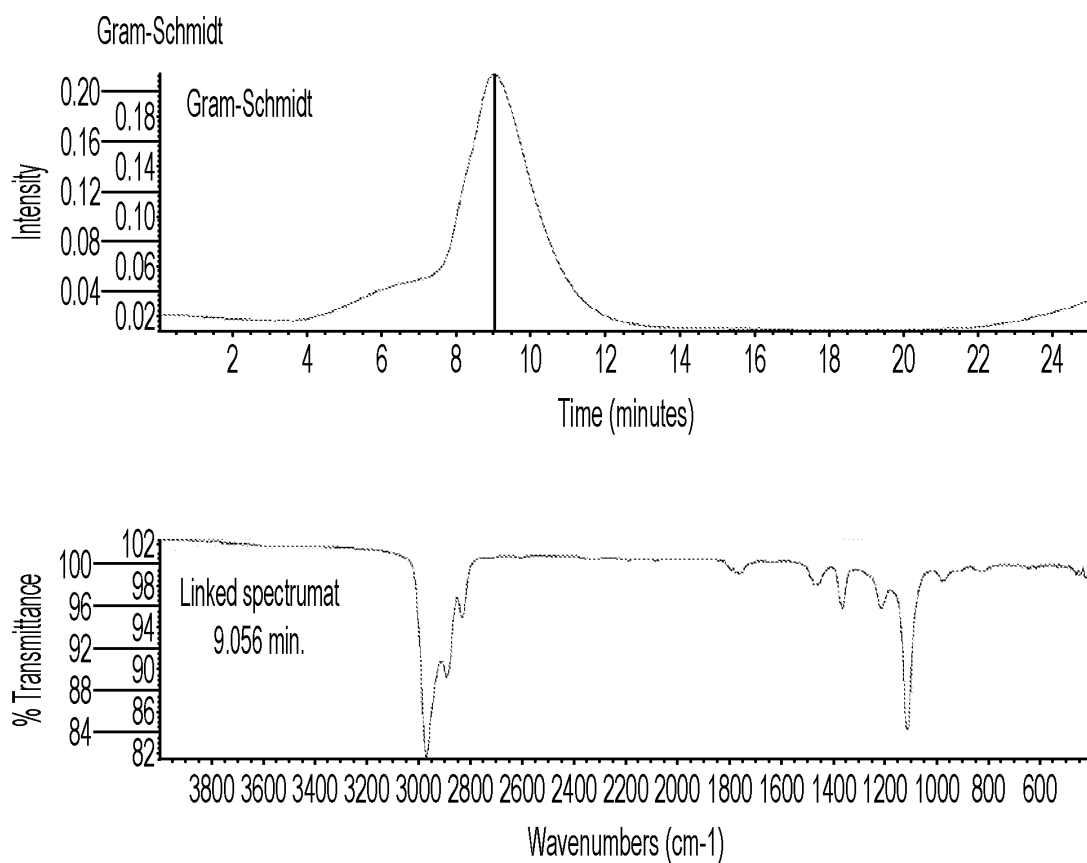


FIG. 29

Overlay IR spectra of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, cyclopentyl methyl ether solvate, Form 9 (top) and cyclopentyl methyl ether solvent (bottom)

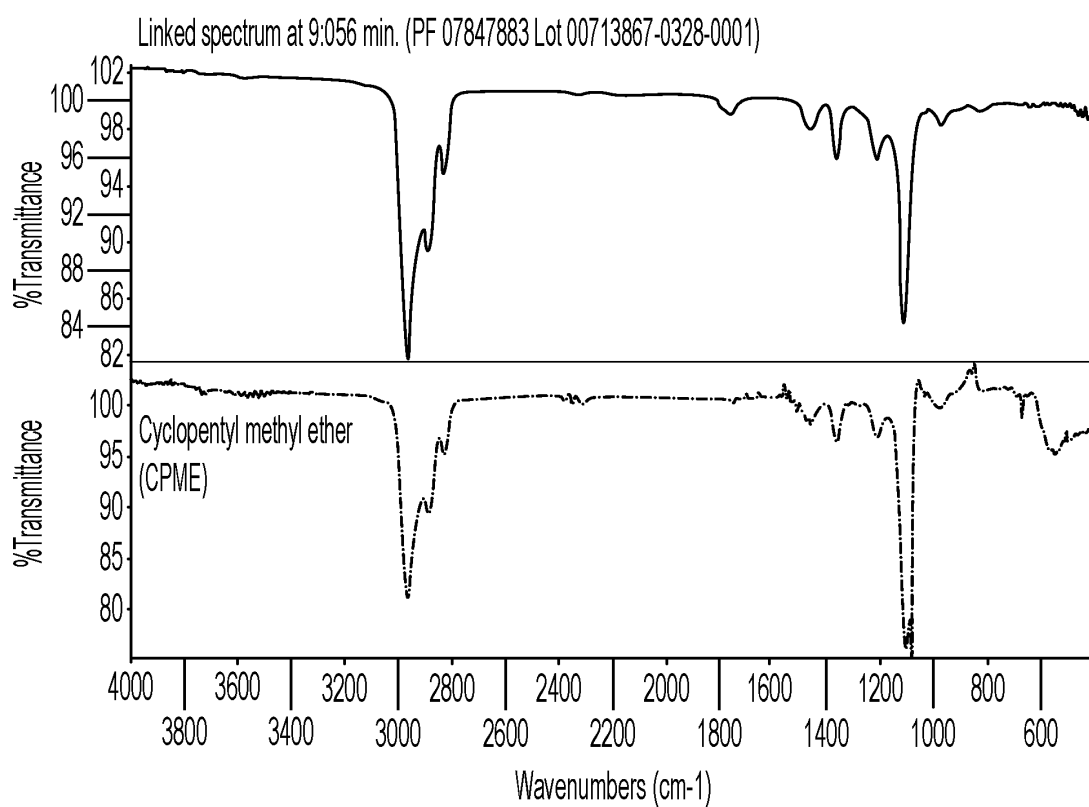


FIG. 30

TGA of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 11 (TGA-IR)

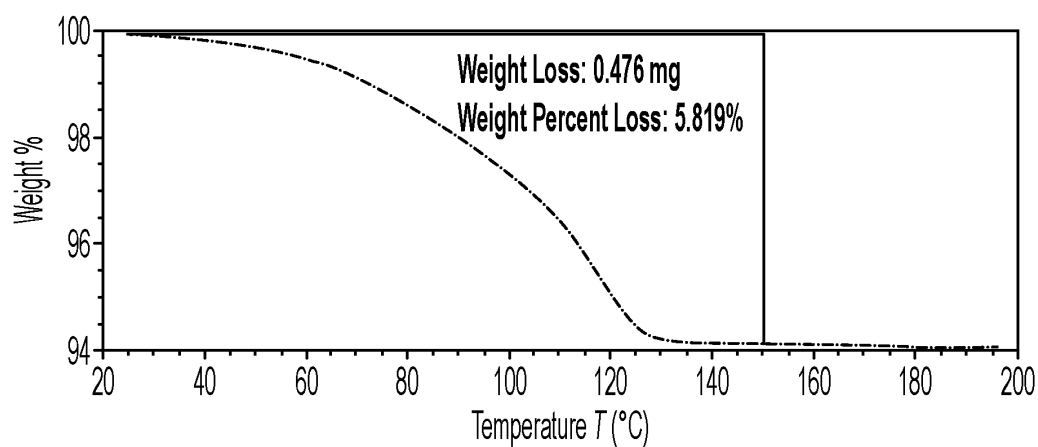


FIG. 31

Gram-Schmidt and IR of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 11 (TGA-IR) at 10.321 min

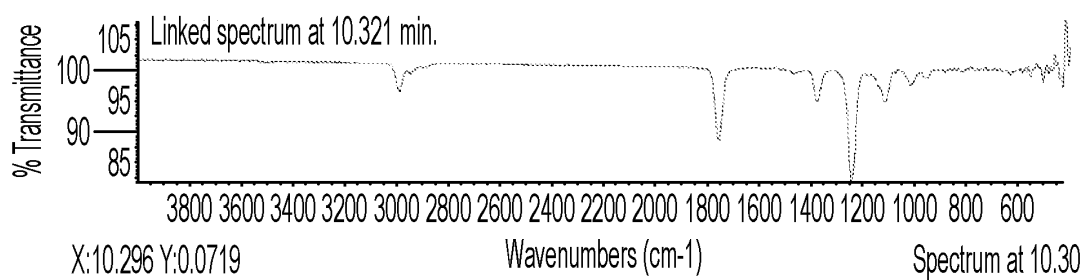
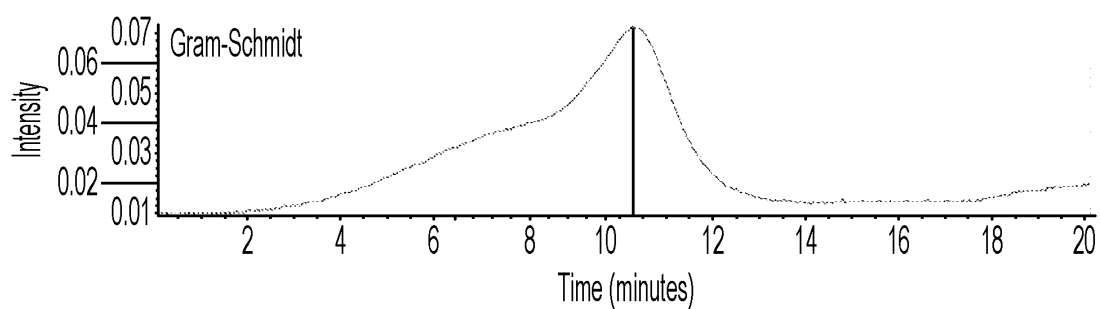


FIG. 32

Overlay of IR spectra of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, isopropyl acetate solvate, Form 11 at 10.321 min (top) and isopropyl acetate (bottom)

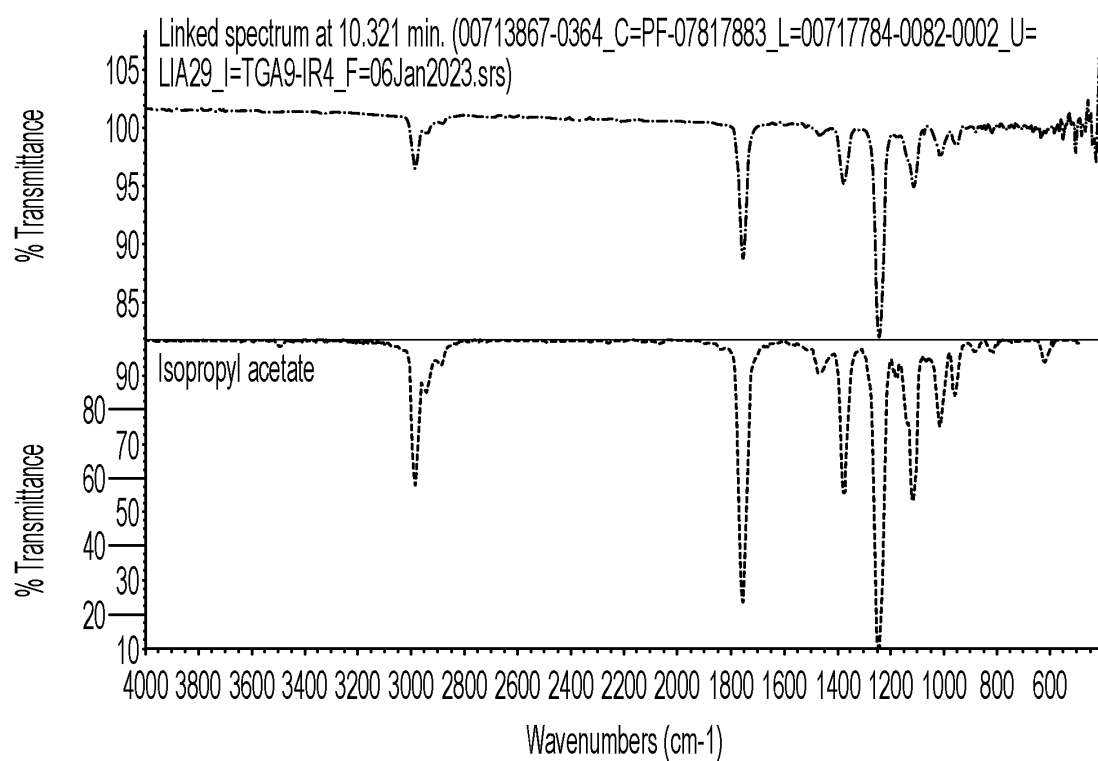


FIG. 33

Modulated DSC data of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-({(1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl})-4-(trifluoromethyl)-L-prolinamide, Form 10 amorphous free form, showing a T_g of ~ 95 °C

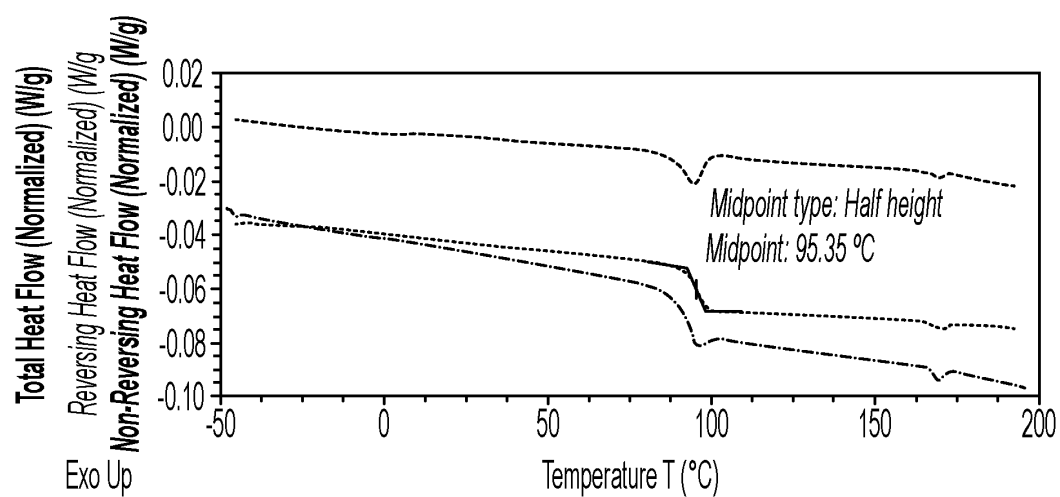


FIG. 34

Modulated DSC data of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide 750 mg/g SDD, showing a T_g of ~92 °C

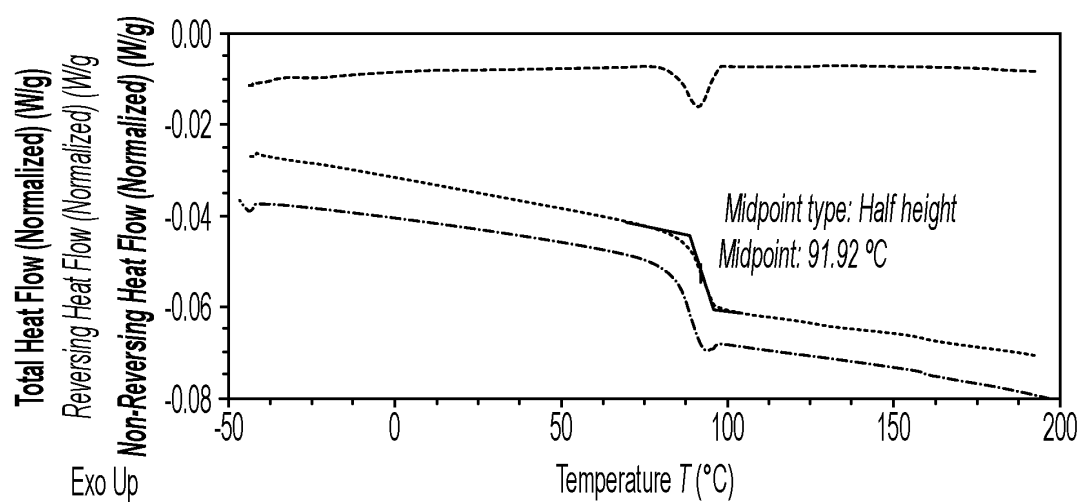


FIG. 35

Partial asymmetric unit diagram with representative labeling scheme and anisotropic displacement parameters drawn at 50% probability for Form 14. Absolute configuration assignments are given as calculated in PLATON

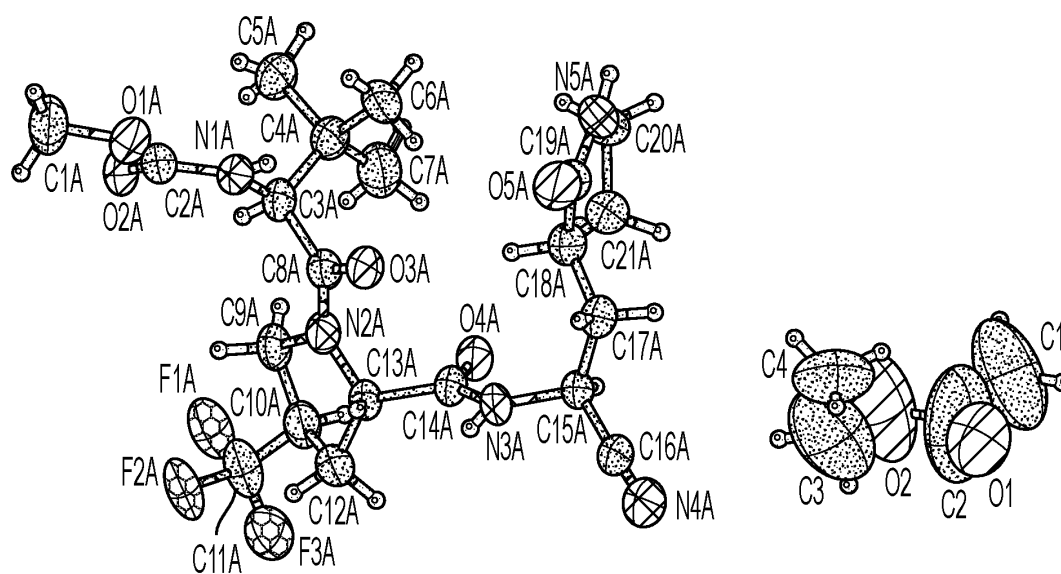


FIG. 36

Calculated powder pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, ethyl acetate solvate, Form 14

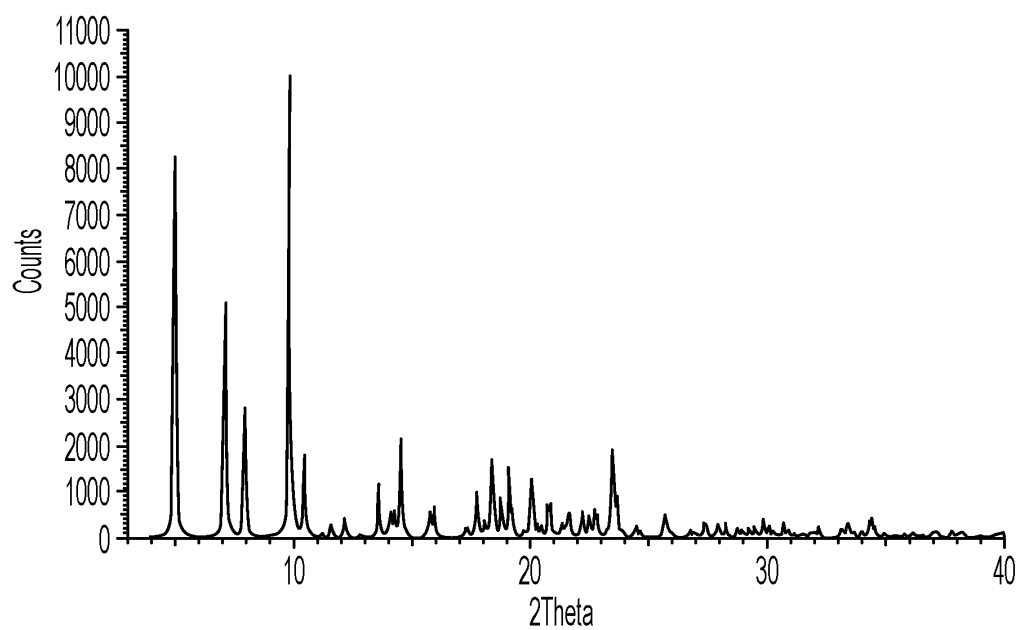
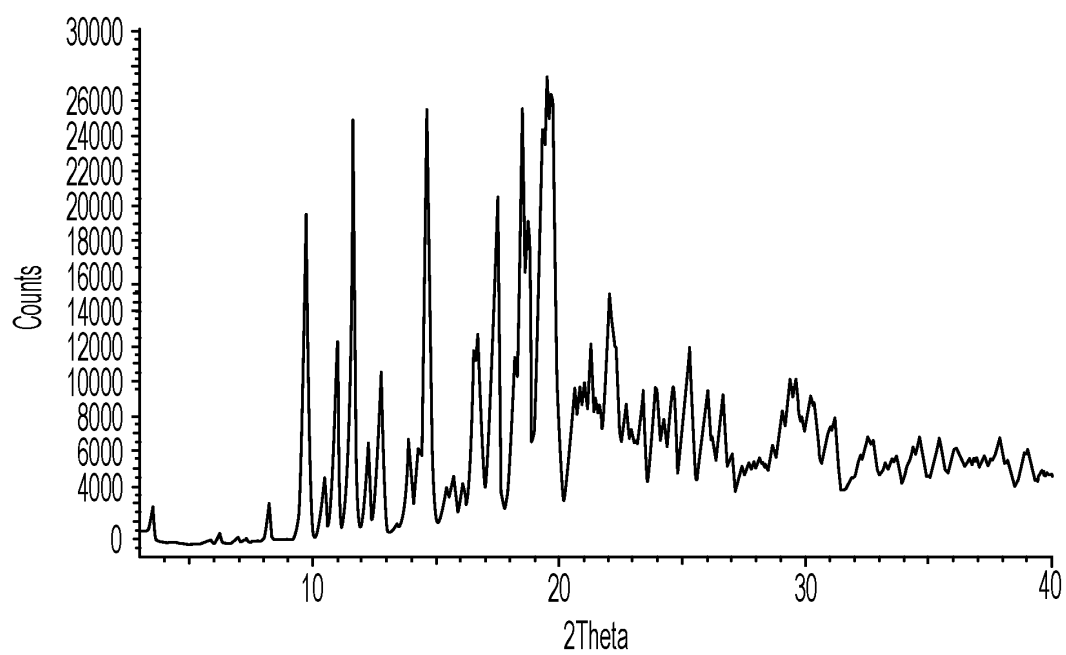


FIG. 37

PXRD pattern of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 22



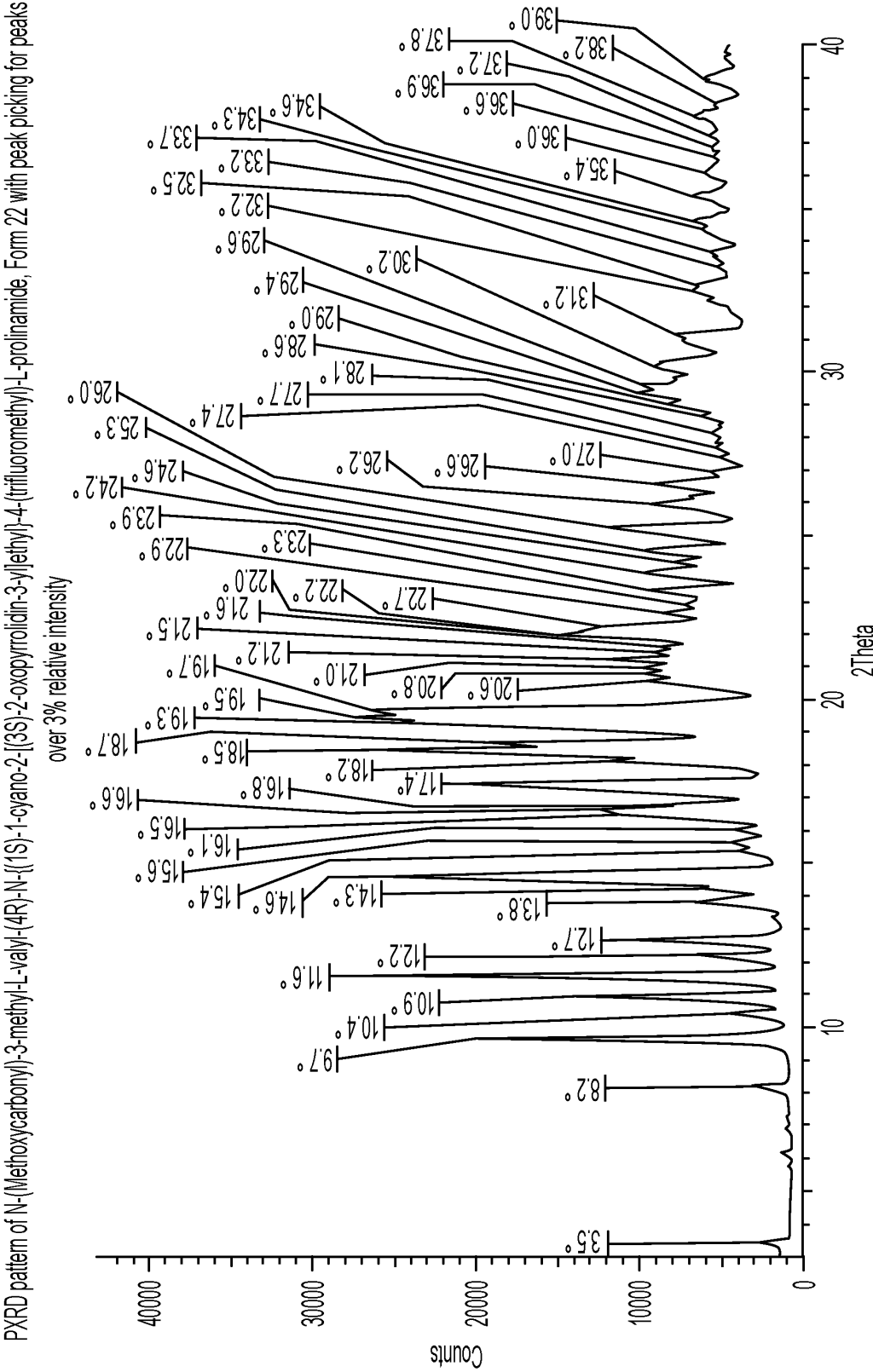


FIG. 38

FIG. 39

ORTEP diagram (color) drawn with displacement parameters at 50% for N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 22 asymmetric unit

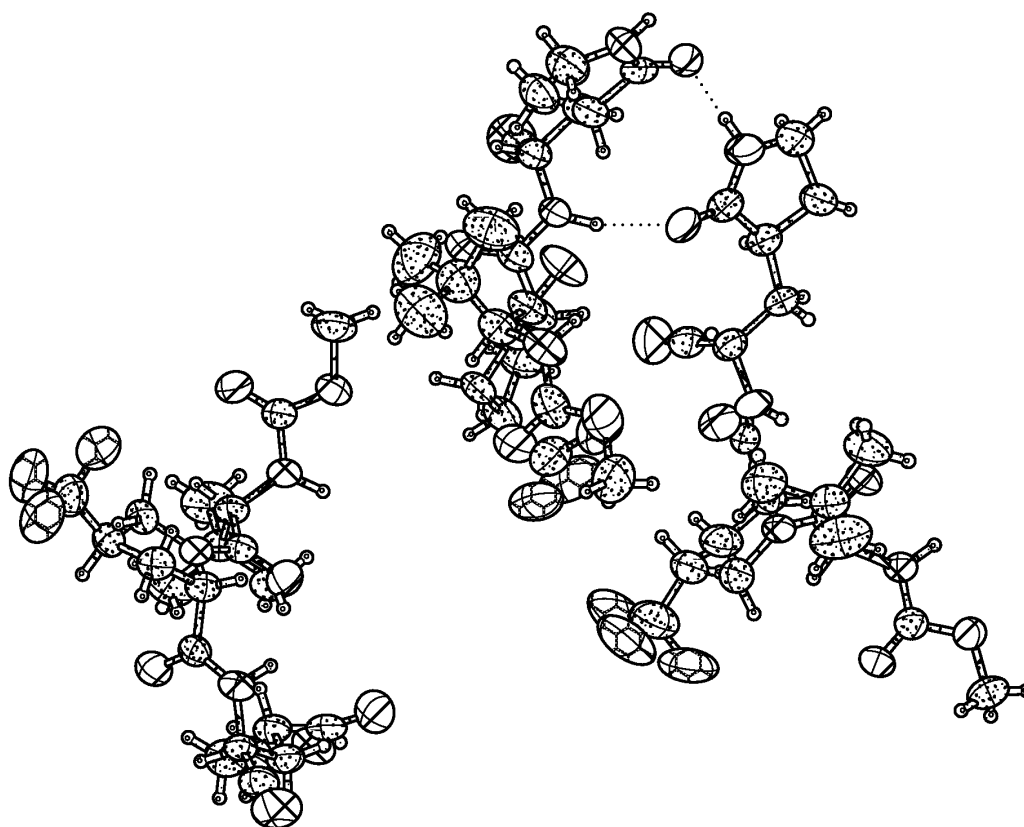


FIG. 40

Overlay of powder pattern obtained for N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-[(3S)-2-oxopyrrolidin-3-yl]ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 22 (bottom) and calculated powder pattern from single crystal data (top)

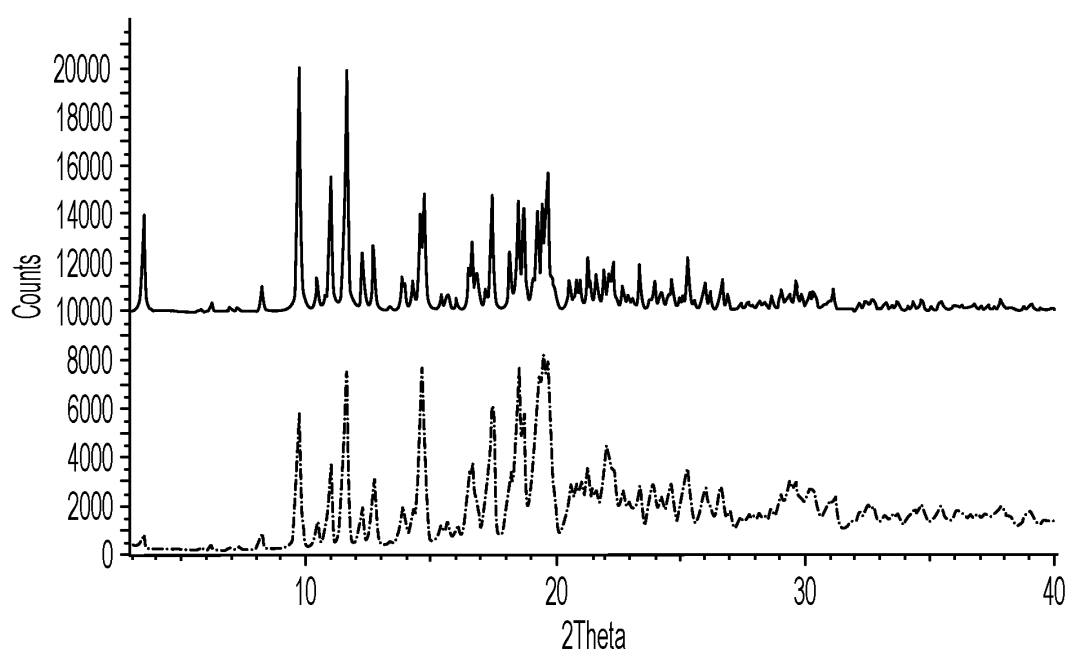


FIG. 41

^{13}C solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-((3S)-2-oxopyrrolidin-3-yl)ethyl)-4-(trifluoromethyl)-L-prolinamide, Form 22. The peaks marked by hashes are spinning side bands

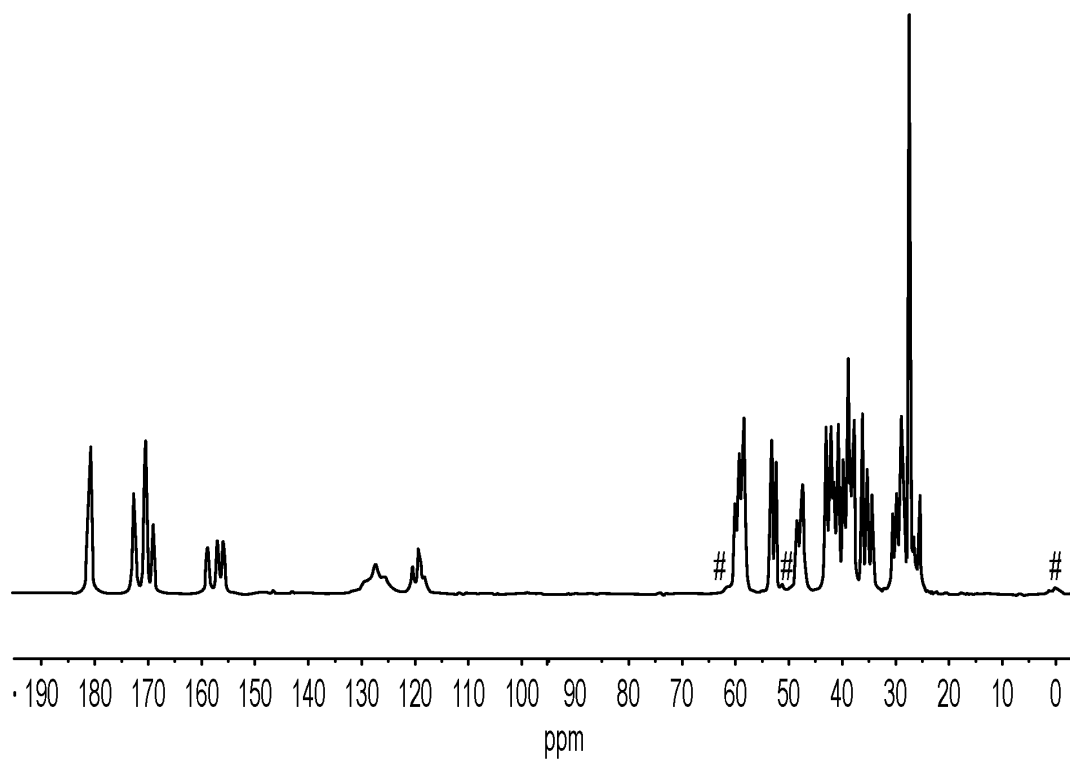


FIG. 42

^{19}F solid-state NMR spectrum of N-(Methoxycarbonyl)-3-methyl-L-valyl-(4R)-N-((1S)-1-cyano-2-((3S)-2-oxopyrrolidin-3-yl)ethyl)-4-(trifluoromethyl)-L-prolinamide Form 22. The peaks marked by hashes are spinning side bands

