

***Supporting Information for***

**Chemo- and Diastereoselective Synthesis of *N*-Propargyl Oxazolidines  
through a Copper-Catalyzed Domino A<sup>3</sup> Reaction**

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333 Longteng Road, Shanghai, 201620, China; \*E-mail: [hdfeng@sues.edu.cn](mailto:hdfeng@sues.edu.cn);

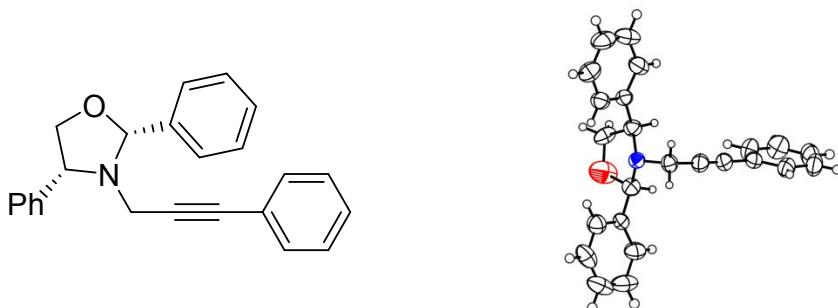
<sup>†</sup>These authors contributed equally

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Structure Determination, Crystal data and ORTEP drawing of compound **5a**  
(ellipsoids show 50% probability levels, CCDC: 1886402)

ORTEP drawing:



**Crystal data:**

Empirical formula	C <sub>24</sub> H <sub>21</sub> NO
Formula weight	339.42
Temperature/K	293
Crystal system	triclinic
Space group	P-1
a/Å	9.5434(15)
b/Å	10.2429(15)
c/Å	10.6535(15)
α/°	71.312(4)
β/°	76.320(4)
γ/°	87.190(4)
Volume/Å <sup>3</sup>	958.1(2)
Z	2
ρ <sub>calc</sub> g/cm <sup>3</sup>	1.177
μ/mm <sup>-1</sup>	0.071
F(000)	360.0
Crystal size/mm <sup>3</sup>	0.190 × 0.160 × 0.100
Radiation	MoKα (λ = 0.71073)
2Θ range for data collection/°	4.394 to 60.122
Index ranges	-12 ≤ h ≤ 13, -14 ≤ k ≤ 14, -15 ≤ l ≤ 13
Reflections collected	9067
Independent reflections	5507 [R <sub>int</sub> = 0.0265, R <sub>sigma</sub> = 0.0629]
Data/restraints/parameters	5507/0/236
Goodness-of-fit on F <sup>2</sup>	1.049
Final R indexes [I>=2σ (I)]	R <sub>1</sub> = 0.0901, wR <sub>2</sub> = 0.1928
Final R indexes [all data]	R <sub>1</sub> = 0.1697, wR <sub>2</sub> = 0.2250
Largest diff. peak/hole / e Å <sup>-3</sup>	0.20/-0.20

## Experimental

Single crystals of C<sub>24</sub>H<sub>21</sub>NO were grown from petroleum ether (bp 40-60 °C) and DCM at - 15 °C (refrigerator). A suitable crystal was selected and diffraction data were collected on a 'Bruker APEX-II CCD' diffractometer. The crystal was kept at 293 K during data collection. Using Olex2<sup>[1]</sup>, the structure was solved with the ShelXT<sup>[2]</sup> structure solution program using intrinsic phasing and refined with the ShelXL<sup>[3]</sup> refinement package using least squares minimisation.

[1] Dolomanov, O.V., Bourhis, L.J., Gildea, R.J., Howard, J.A.K. & Puschmann, H. (2009), *J. Appl. Cryst.* 42, 339-341.

[2] Sheldrick, G.M. (2015). *Acta Cryst. A* 71, 3-8.

[3] Sheldrick, G.M. (2015). *Acta Cryst. C* 71, 3-8.

## Crystal structure determination of 5a

**Crystal Data** for C<sub>24</sub>H<sub>21</sub>NO ( $M=339.42$  g/mol): triclinic, space group P-1 (no. 2),  $a = 9.5434(15)$  Å,  $b = 10.2429(15)$  Å,  $c = 10.6535(15)$  Å,  $\alpha = 71.312(4)$ ,  $\beta = 76.320(4)$ ,  $\gamma = 87.190(4)$ ,  $V = 958.1(2)$  Å<sup>3</sup>,  $Z = 2$ ,  $T = 293$  K,  $\mu(\text{MoK}\alpha) = 0.071$  mm<sup>-1</sup>,  $D_{\text{calc}} = 1.177$  g/cm<sup>3</sup>, 9067 reflections measured ( $4.394^\circ \leq 2\Theta \leq 60.122^\circ$ ), 5507 unique ( $R_{\text{int}} = 0.0265$ ,  $R_{\text{sigma}} = 0.0629$ ) which were used in all calculations. The final  $R_1$  was 0.0901 ( $I > 2\sigma(I)$ ) and  $wR_2$  was 0.2250 (all data).

## Refinement model description

Number of restraints - 0, number of constraints - unknown.

Details:

1. Fixed Uiso

At 1.2 times of:

All C(H) groups, All C(H,H) groups

2. Shared sites

{O15, C14A}

{C14, O15A}

3. Uiso/Uaniso restraints and constraints

Uanis(O15) = Uanis(C14A)

Uanis(C14) = Uanis(O15A)

#### 4. Others

Sof(O15A)=Sof(H7B)=Sof(H8B)=Sof(C14A)=Sof(H14C)=Sof(H14D)=1-FVAR(1)

Sof(O15)=Sof(H7A)=Sof(H8A)=Sof(C14)=Sof(H14A)=Sof(H14B)=FVAR(1)

5.a Ternary CH refined with riding coordinates:

C7(H7A), C7(H7B), C8(H8A), C8(H8B)

5.b Secondary CH<sub>2</sub> refined with riding coordinates:

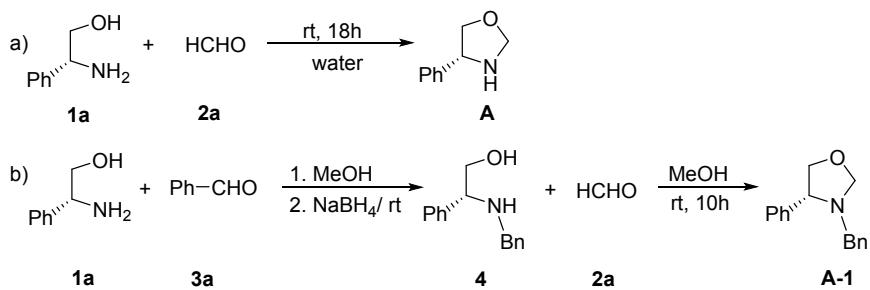
C6(H6A,H6B), C14(H14A,H14B), C14A(H14C,H14D)

5.c Aromatic/amide H refined with riding coordinates:

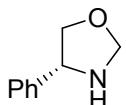
C9(H9), C11(H11), C12(H12), C13(H13), C16(H16), C17(H17), C18(H18),  
C19(H19), C20(H20), C21(H21), C22(H22), C23(H23), C24(H24), C25(H25),  
C26(H26)

This report has been created with Olex2, compiled on 2018.05.29 svn.r3508 for OlexSys. Please [let us know](#) if there are any errors or if you would like to have additional features.

**General Procedure for the Synthesis of Oxazolidines A-1 and A**



To a round flask equipped with a magnetically stirred chip was added chiral hydroxylamine **1a** (2g, 14.6 mmol), formaldehyde solution **2a** (1.2mL, 14.6 mmol) in water (50 mL). After stirring at room temperature for 18 hours, the tegarted compound **A** was filtered and obtained as a white powder.

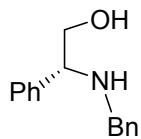


**(R)-4-phenyloxazolidine (A)** (1.7g, white soild, 81% yield,  $>20/1$  dr)  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.41 (d,  $J = 7.3$  Hz, 2H), 7.33 (t,  $J = 7.3$  Hz, 2H), 7.25 (d,  $J = 7.1$  Hz, 1H), 4.83 (s, 1H), 4.66–4.55 (m, 1H), 4.19 (s, 2H), 3.87 (d,  $J = 6.6$  Hz, 2H).

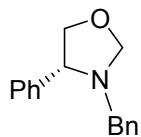
To a round flask equipped with a magnetically stirred chip was added chiral hydroxylamine **1a** (2g, 14.6 mmol), benzaldehyde **3a** (1.5g, 14.6 mmol) in dry MeOH (50 mL) and stirred at room temperature for 8 hours. The reaction was monitored by TLC. Then the mixture was carefully treated with sodium borohydride (0.7 g, 18.1 mmol) and kept stirring about 1 hour, before dilution by water and  $\text{CH}_2\text{Cl}_2$  extraction (3x). Combined organic layers were washed with brine, dried over anhydrous  $\text{NaSO}_4$ , filtered and concentrated to dryness. The crude product was purified by crystallization with 10% ethyl acetate in petroleum ether to afford the desired product **4** as the white solid.

To a test tube equipped with a magnetically stirred chip was added compound **4** (454mg, 2 mmol), formaldehyde solution **2a** (152mg, 2 mmol) in dry MeOH (10 mL). After stirring at room temperature for 10 hours, the resulting reaction suspension was concentrated and directly loaded onto a silicon gel column and

flashed about 10% ethyl acetate in petroleum ether to afford the desired product **A-1** as the light yellow oil.

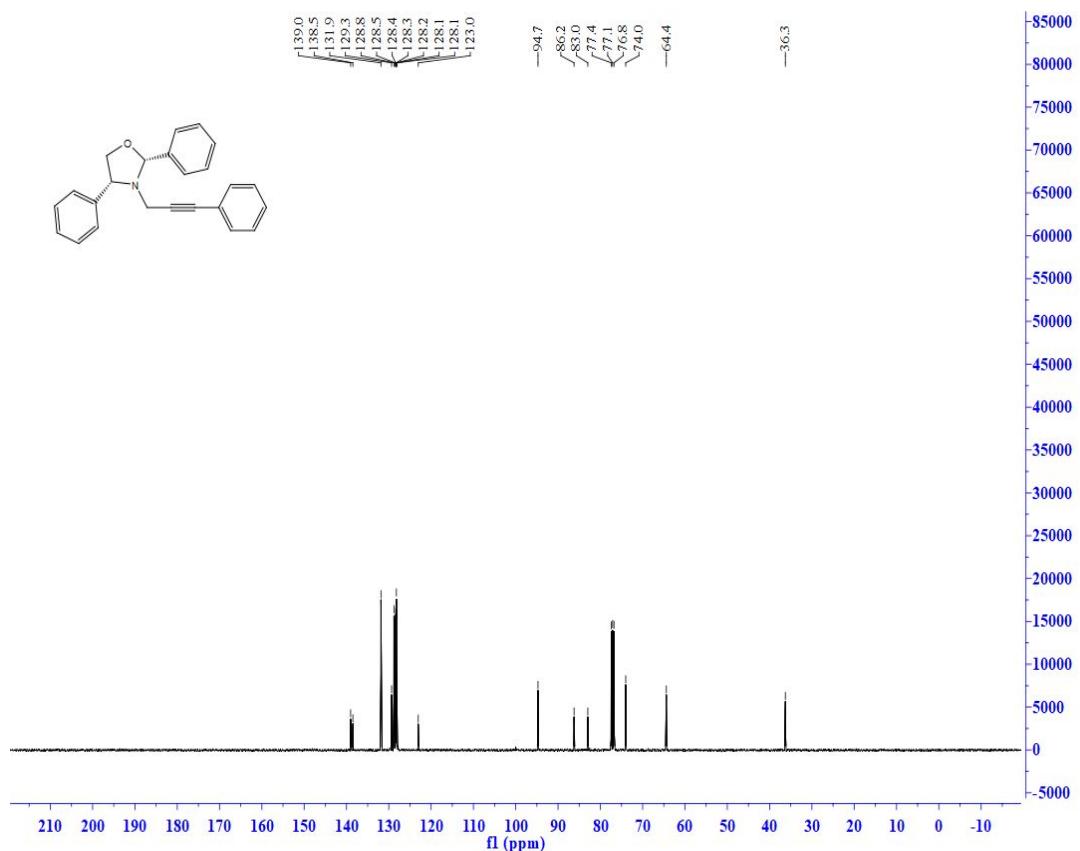
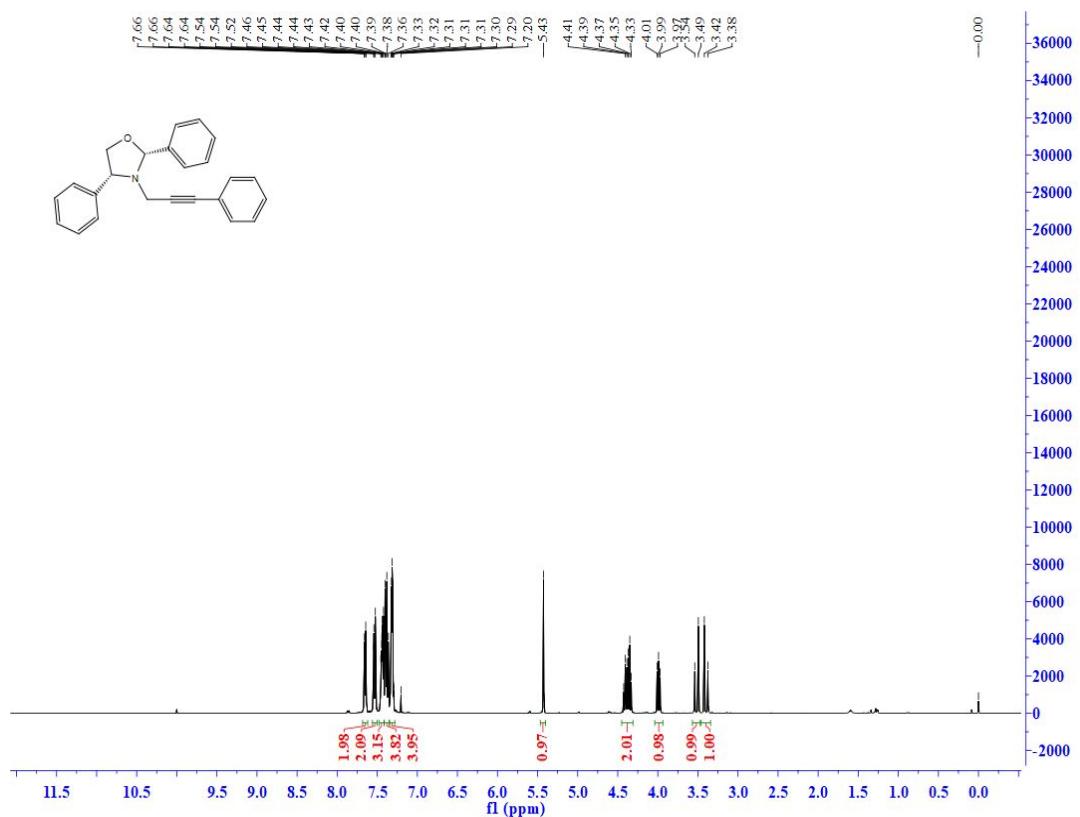


**(R)-2-(benzylamino)-2-phenylethan-1-ol (4)** (2.7g, white solid, 85% yield,  $>20/1$  dr)  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.47–7.24 (m, 10H), 3.88–3.83 (d,  $J = 8.7$  Hz, 1H), 3.82–3.69 (m, 2H), 3.67–3.53 (m, 2H), 2.42 (s, 2H).

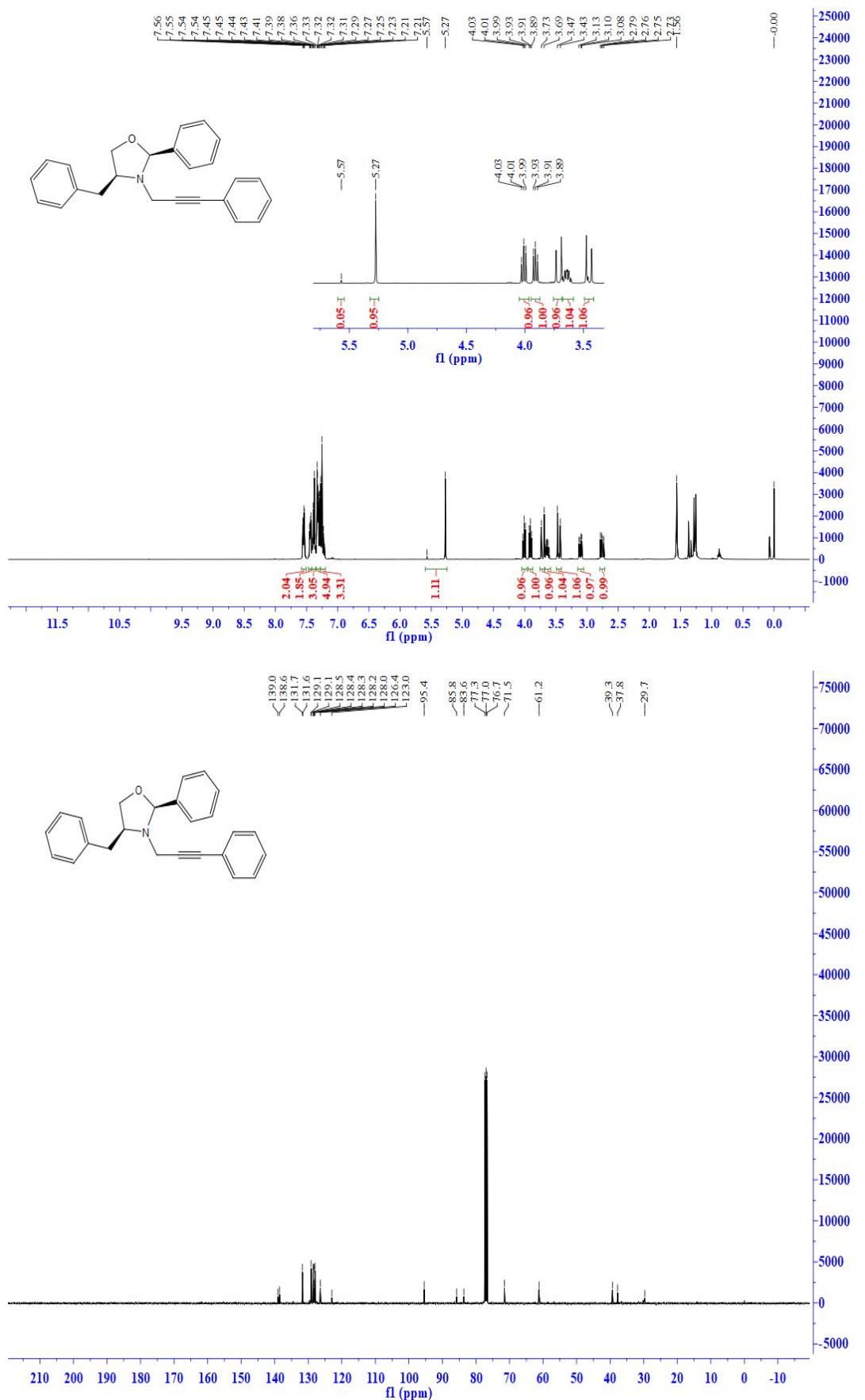


**(R)-3-benzyl-4-phenyloxazolidine (A-1)** (372 mg, light yellow oil, 78% yield,  $>20/1$  dr)  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.57 (d,  $J = 7.2$  Hz, 2H), 7.45 (t,  $J = 7.3$  Hz, 4H), 7.42–7.29 (m, 4H), 4.69 (d,  $J = 3.5$  Hz, 1H), 4.39 (t,  $J = 7.5$  Hz, 1H), 4.30 (d,  $J = 3.5$  Hz, 1H), 4.06–3.94 (m, 2H), 3.83 (t,  $J = 7.8$  Hz, 1H), 3.56 (d,  $J = 13.4$  Hz, 1H).

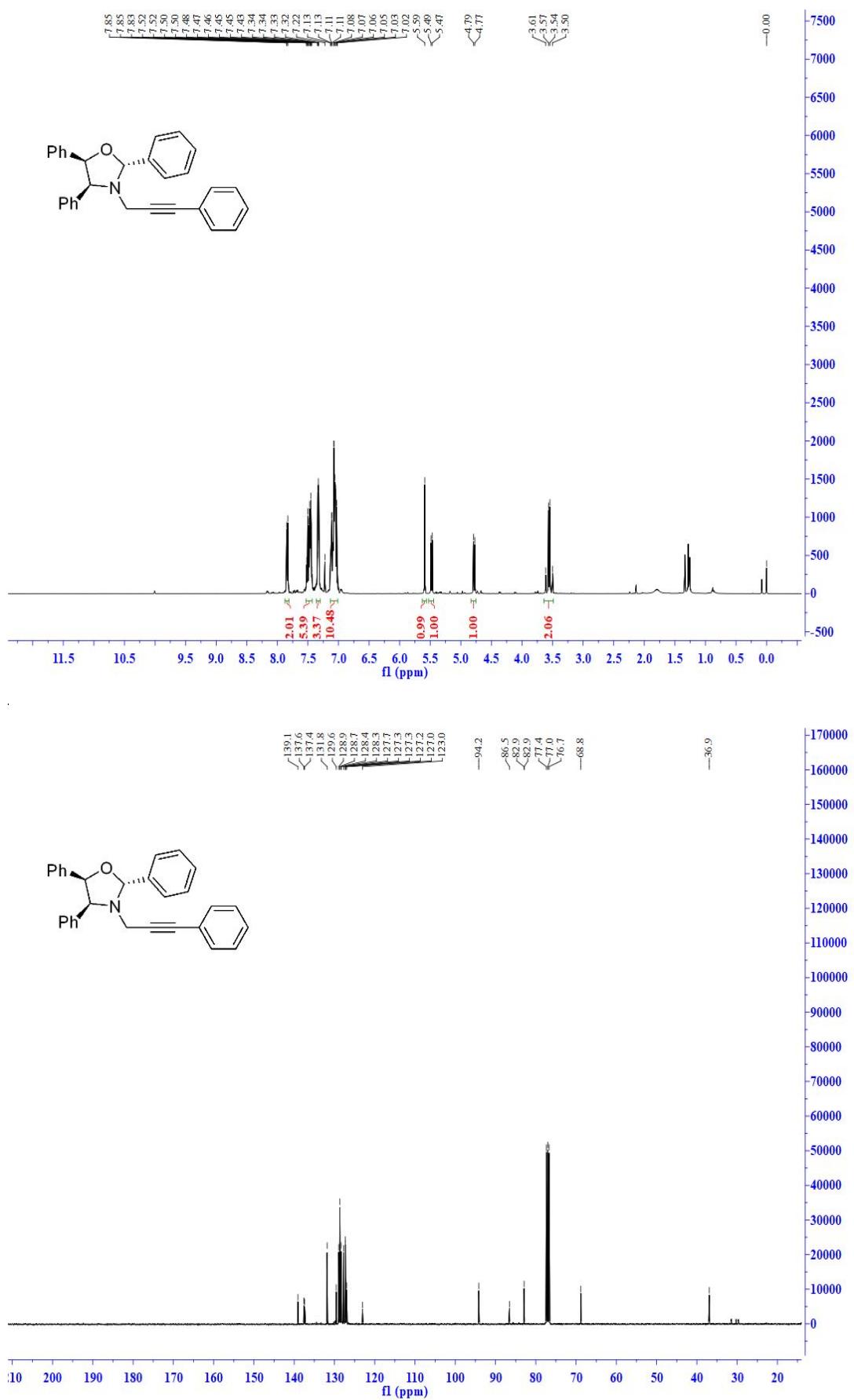
**<sup>1</sup>H NMR and <sup>13</sup>C NMR spectra of all compounds 5**  
**(2*R*,4*R*)-2,4-diphenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5a)**



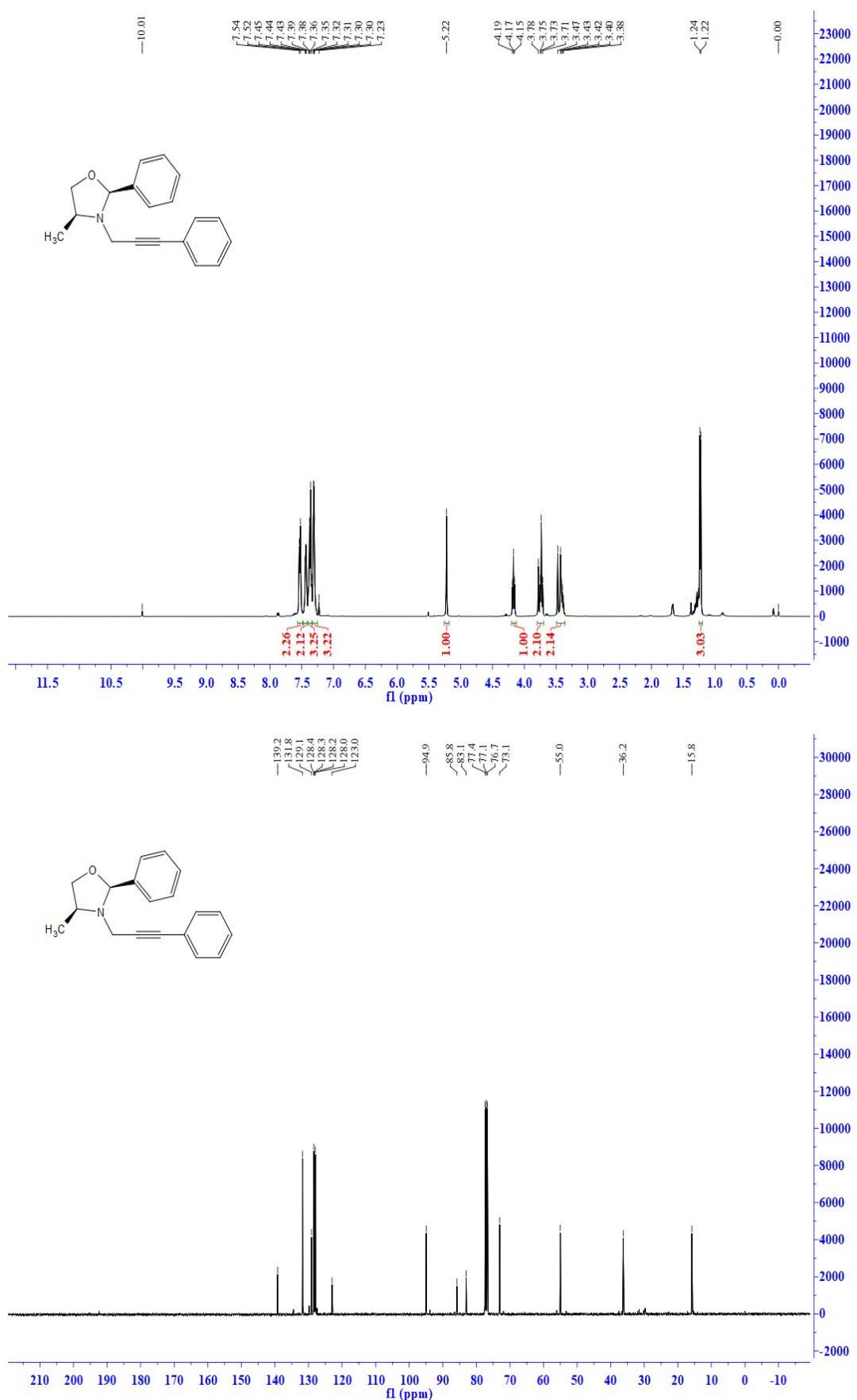
**(2*S*,4*S*)-4-benzyl-2-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5b)**



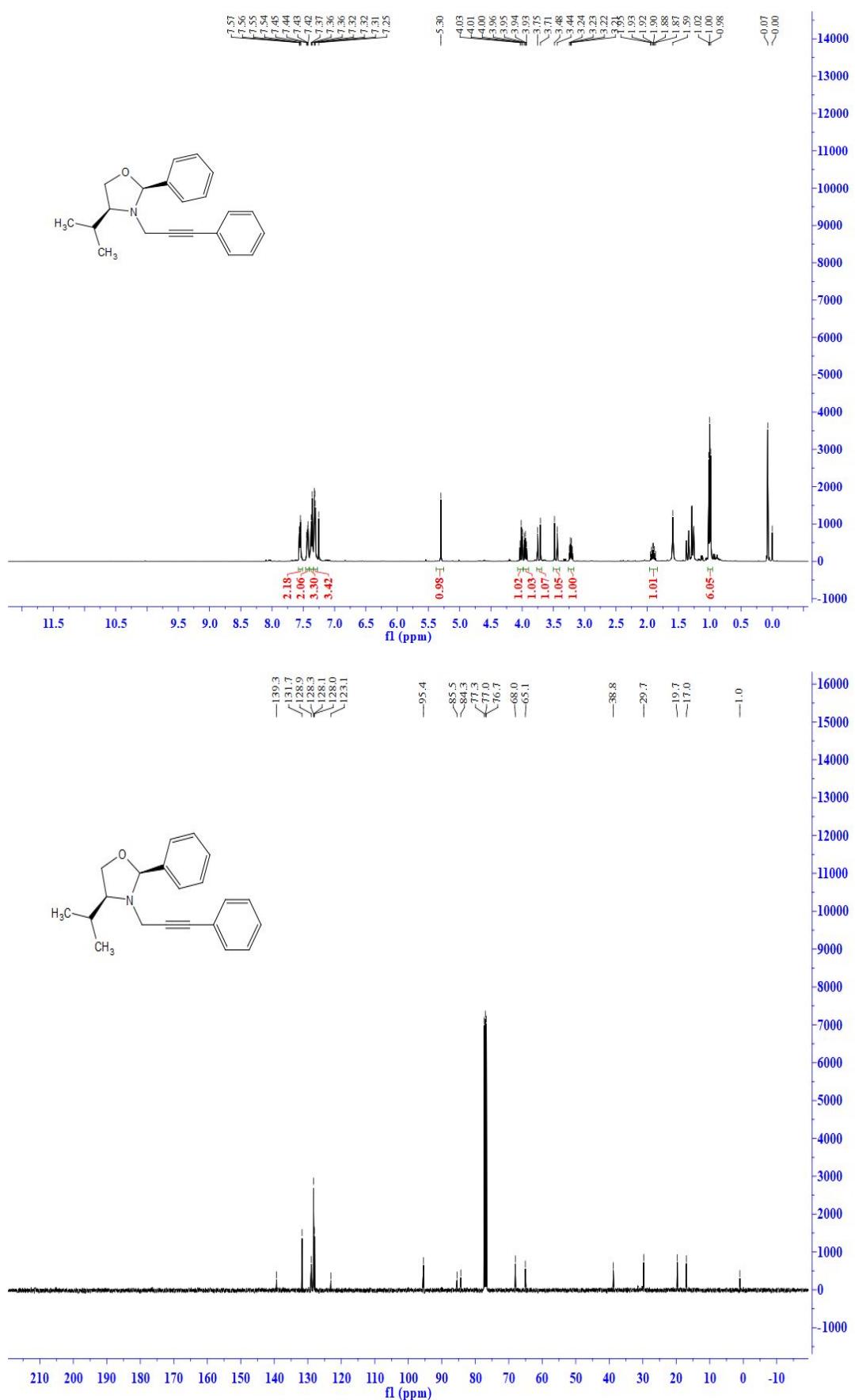
**(2*S*,4*S*,5*S*)-2,4,5-triphenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5c)**



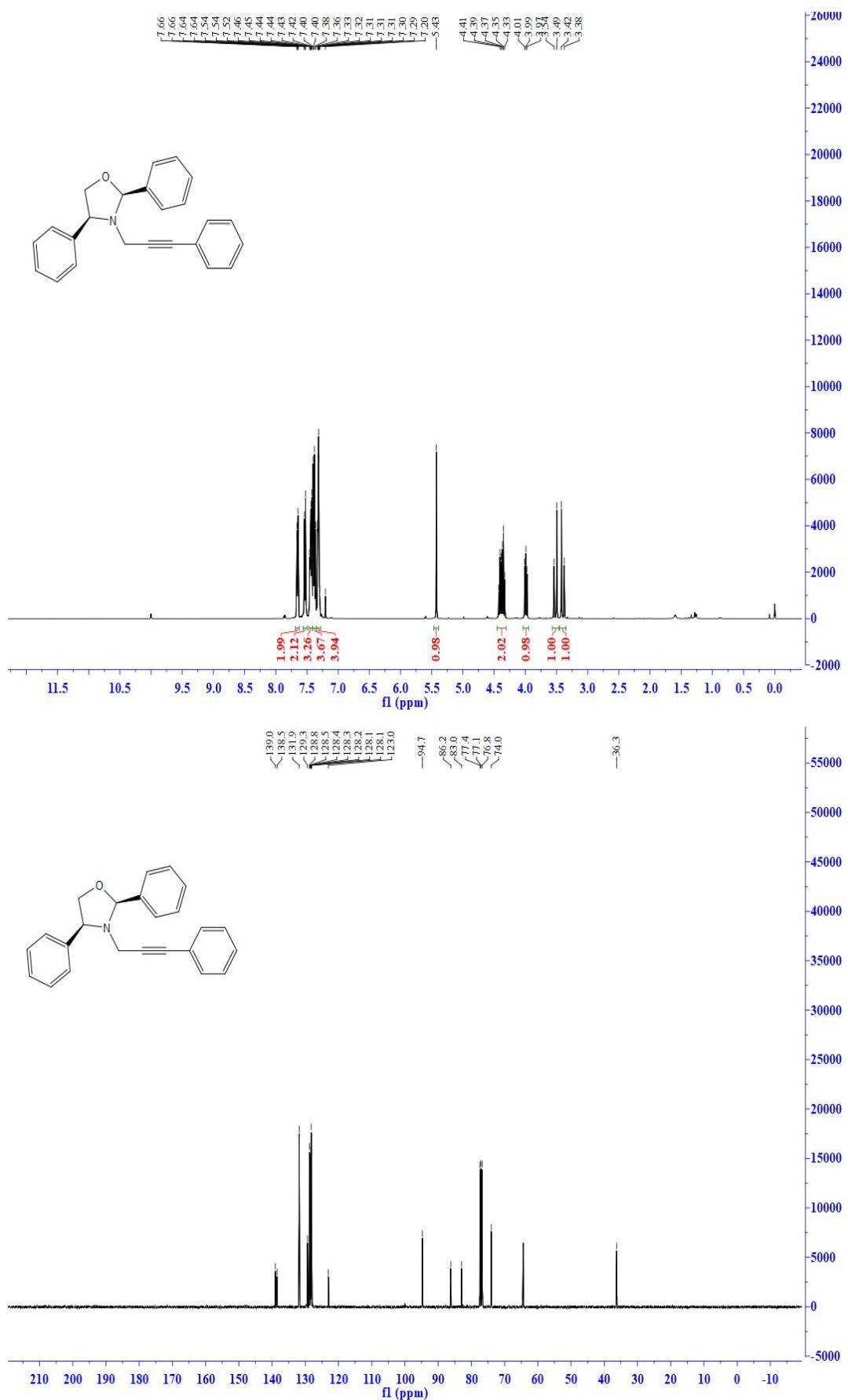
**(2*S*,4*S*)-4-methyl-2-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5d)**



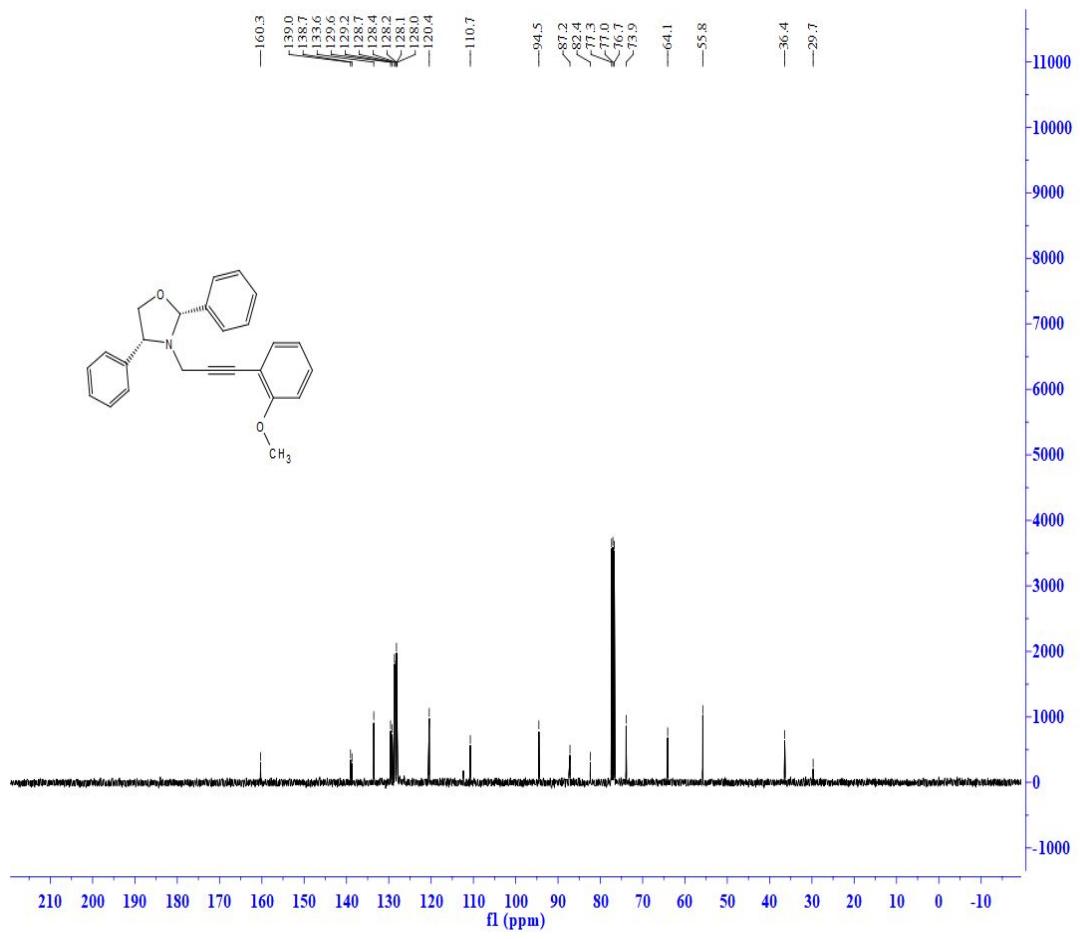
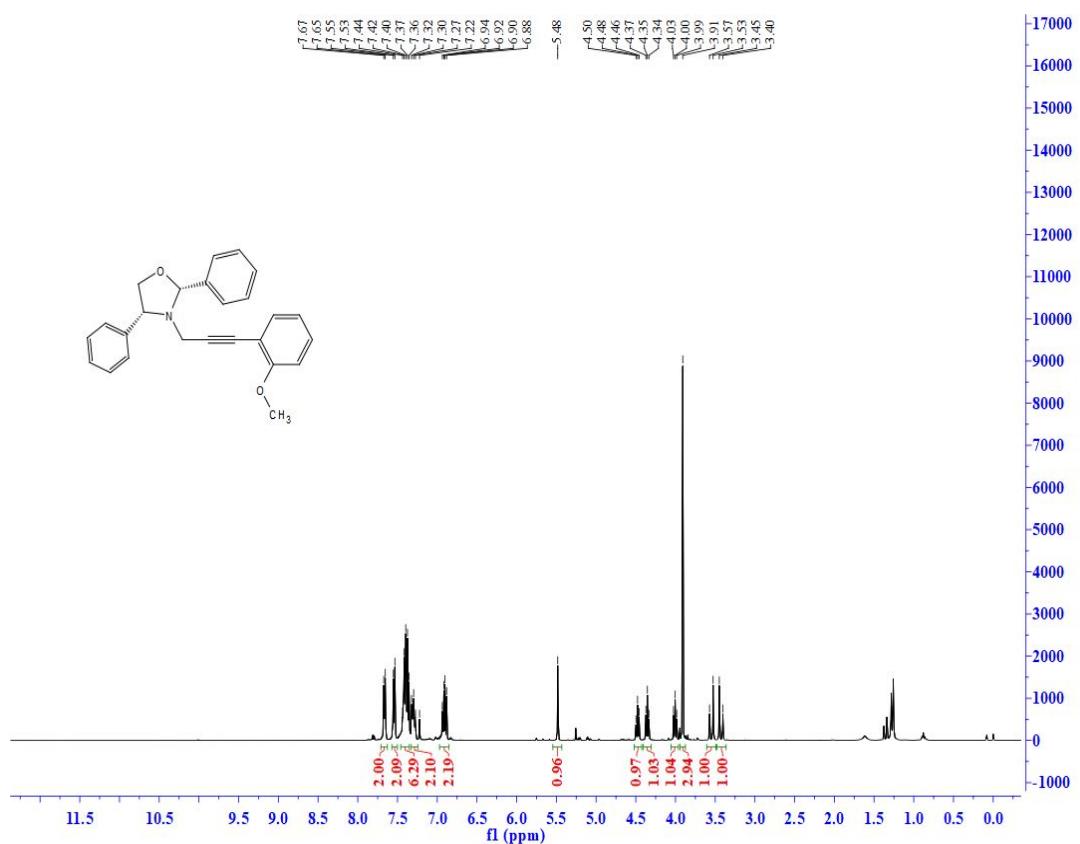
**(2*S*,4*S*)-4-isopropyl-2-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5e)**



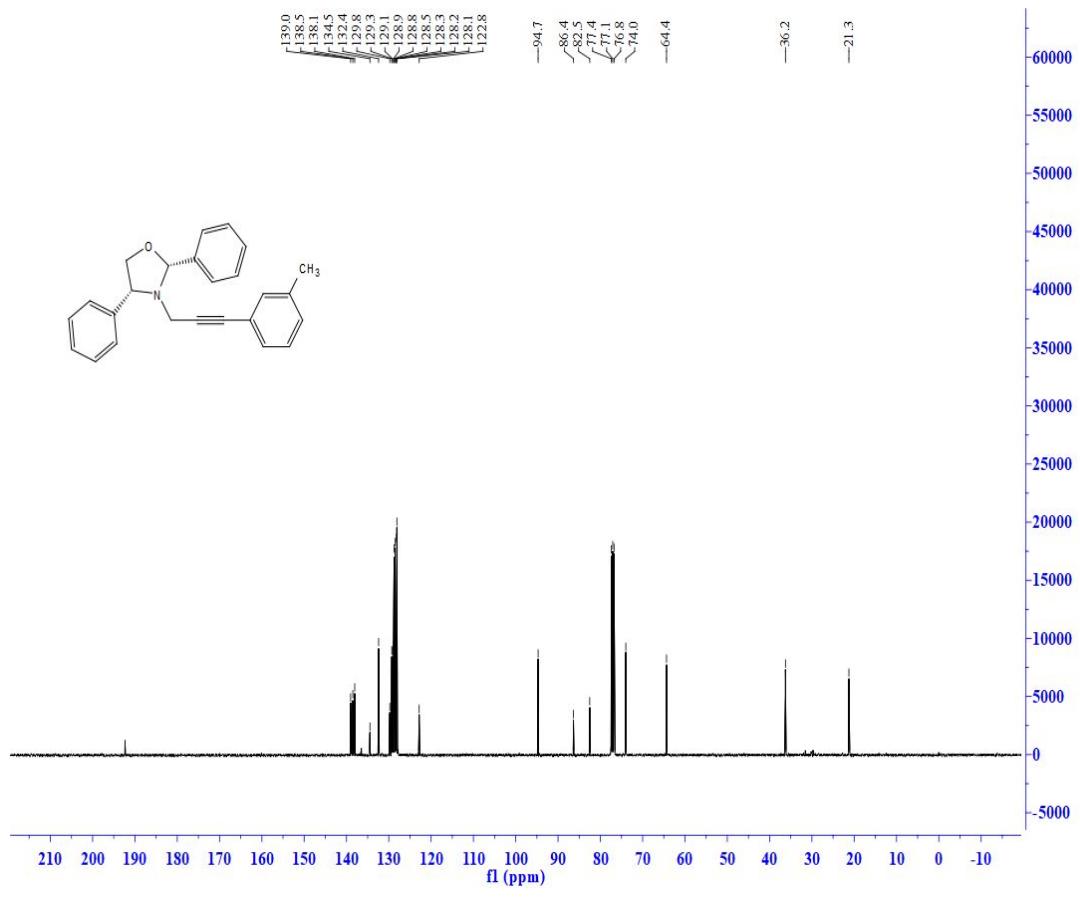
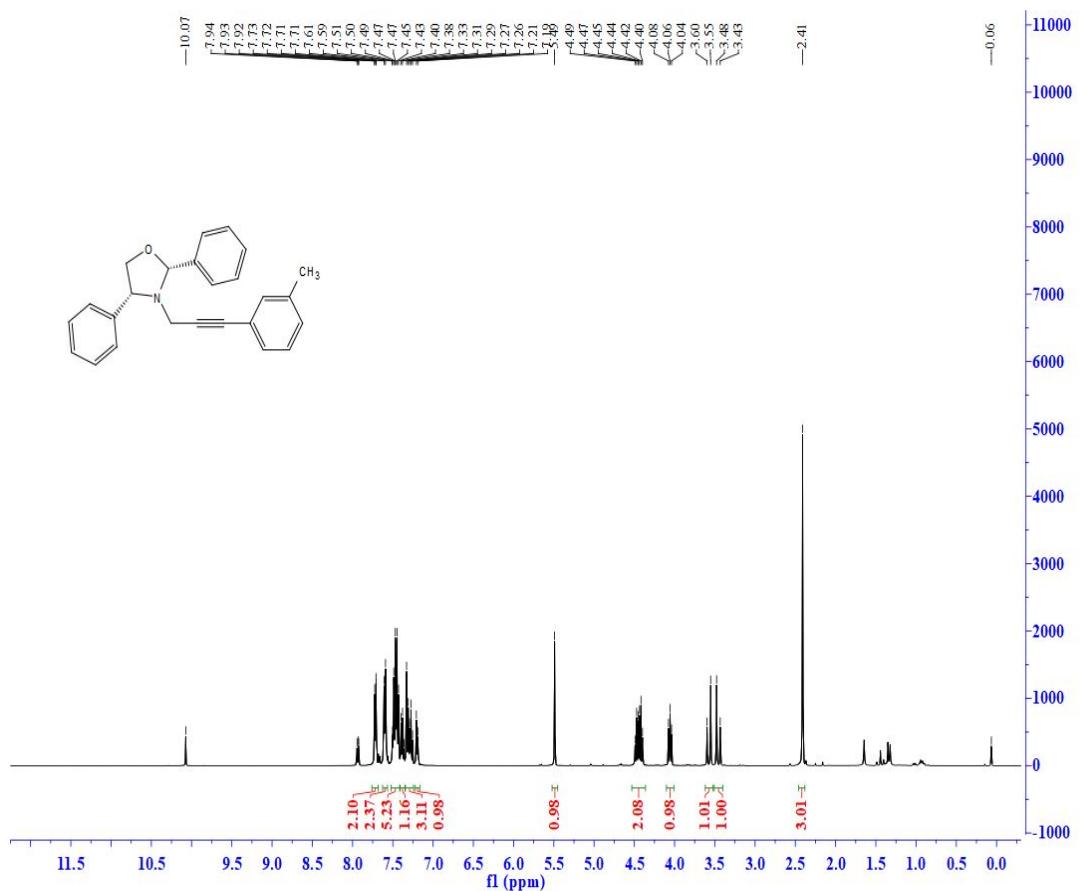
**(2*S*,4*S*)-2,4-diphenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5f)**



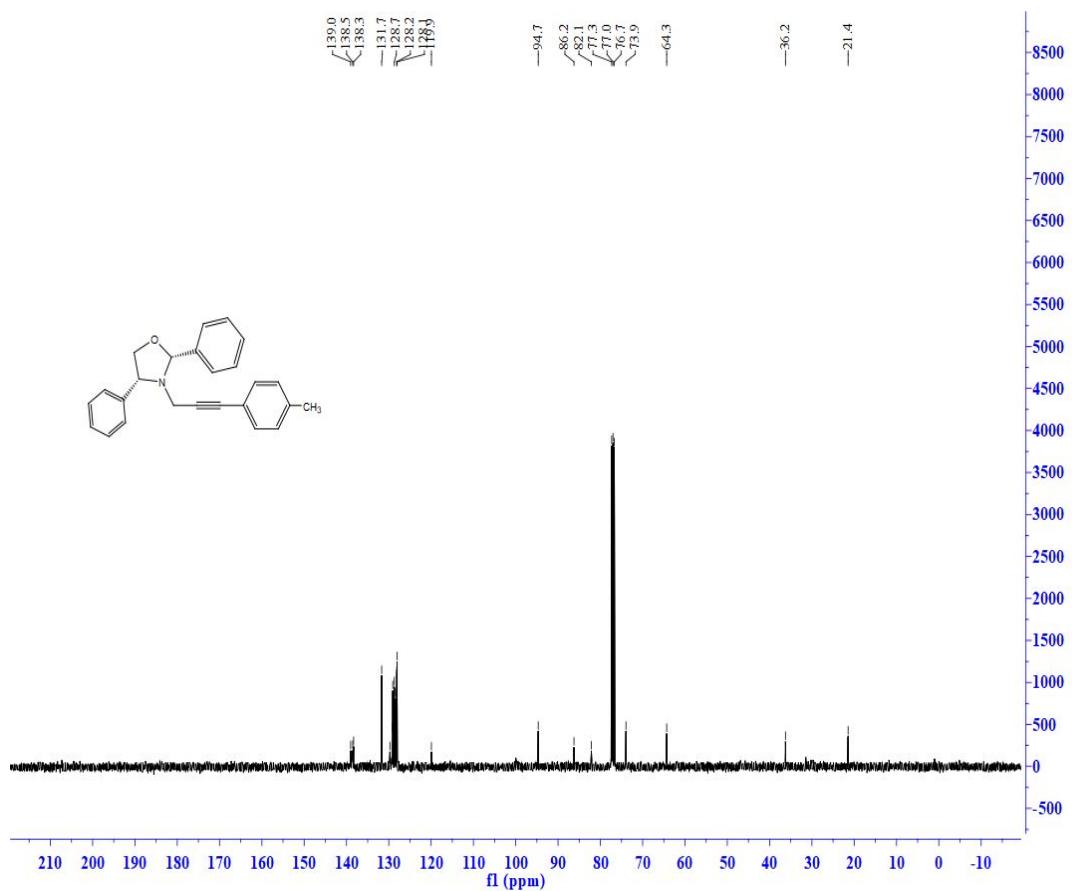
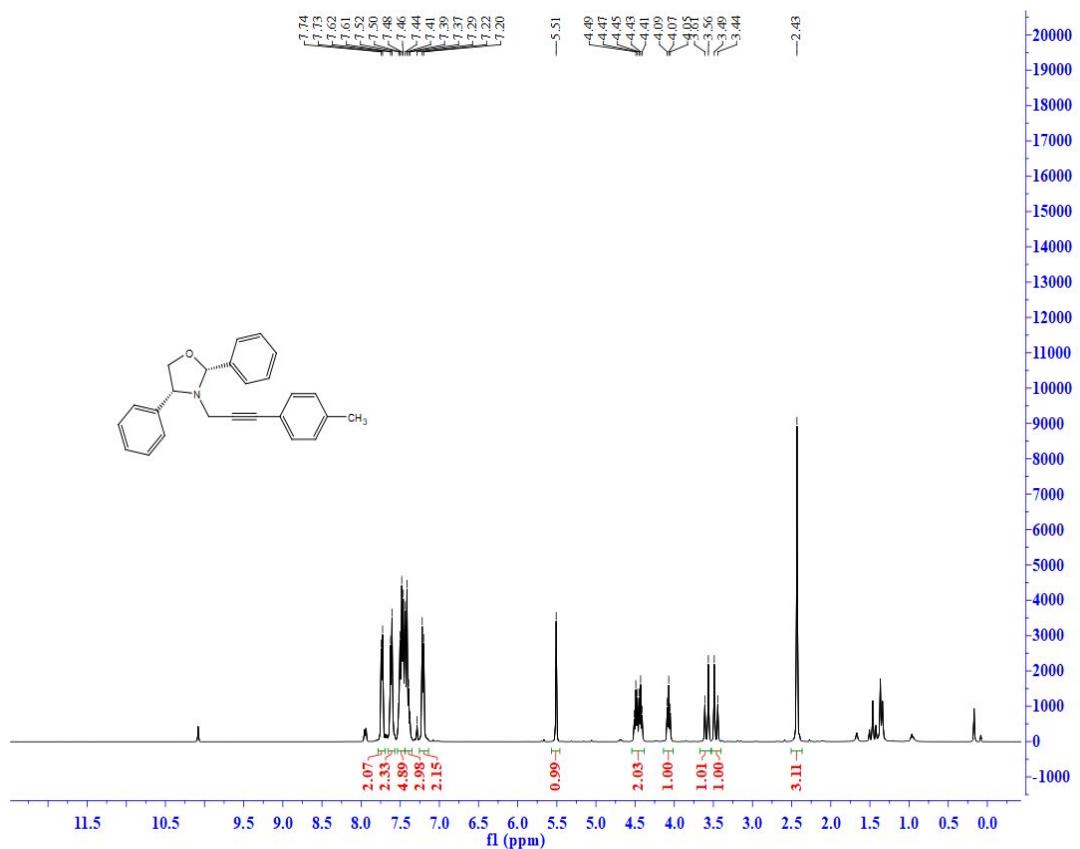
**(2*R*,4*R*)-3-(3-(2-methoxyphenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5g)**



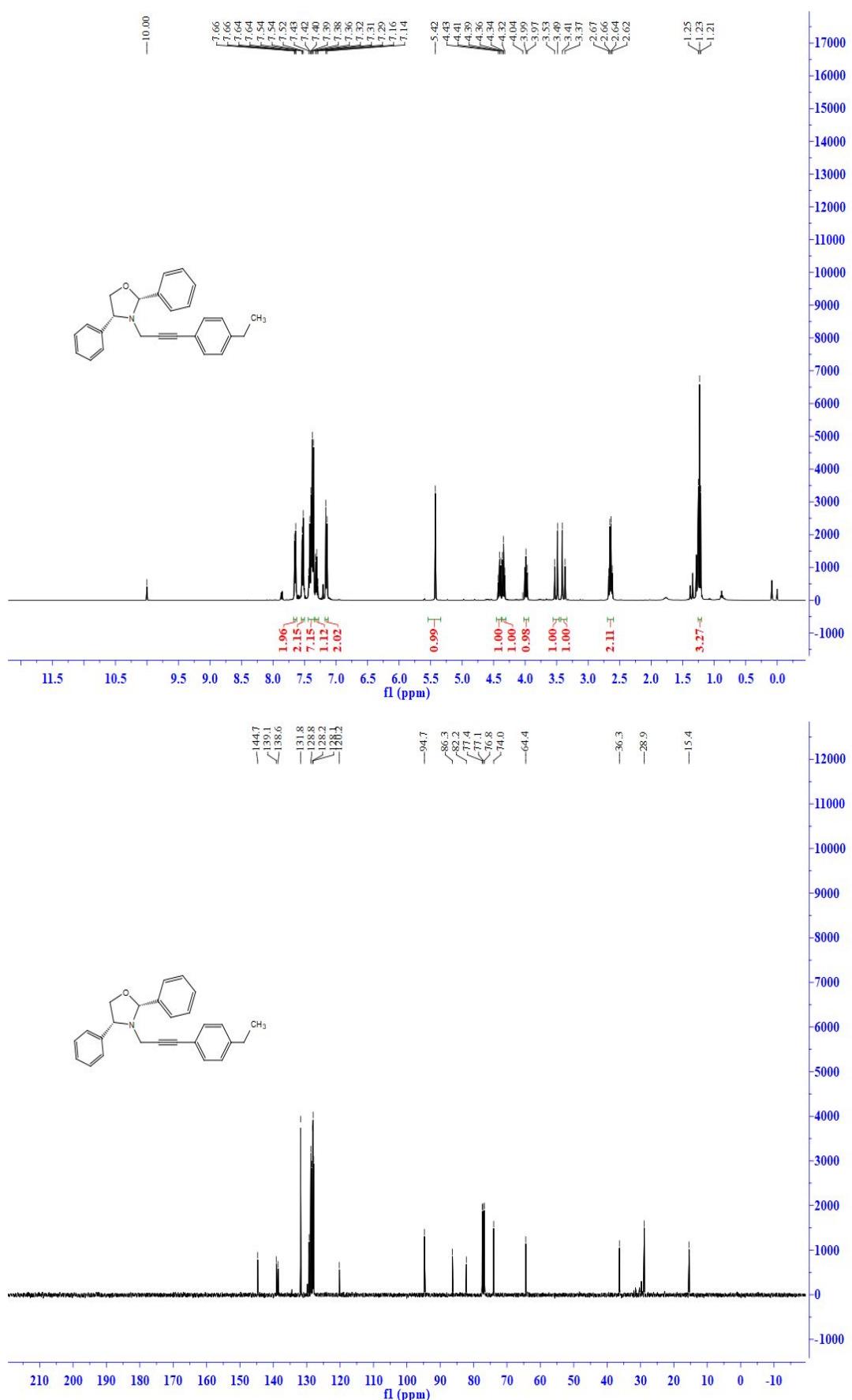
**(2*R*,4*R*)-2,4-diphenyl-3-(3-(m-tolyl)prop-2-yn-1-yl)oxazolididine (5h)**



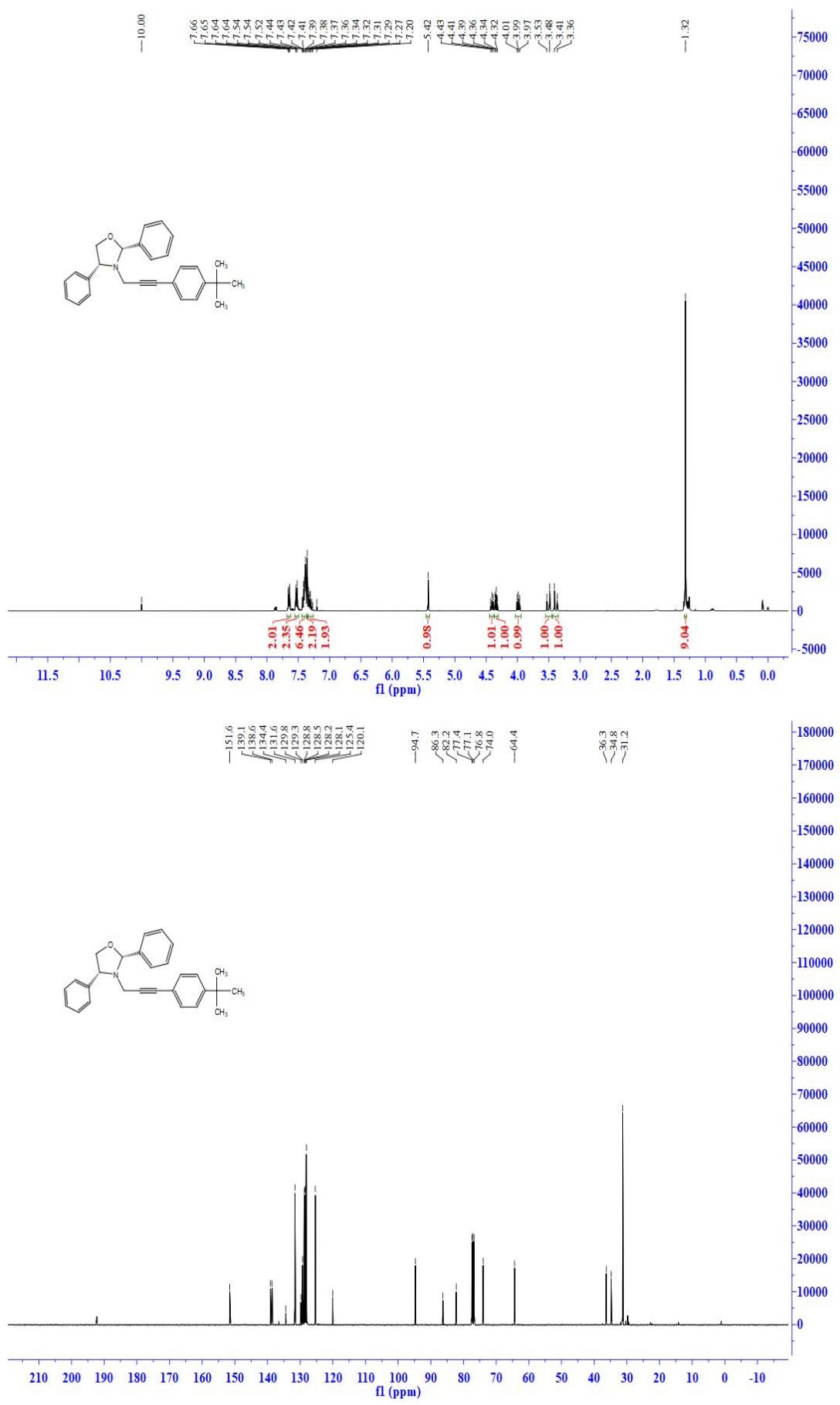
**(2*R*,4*R*)-2,4-diphenyl-3-(3-(*p*-tolyl)prop-2-yn-1-yl)oxazolidine (5i)**



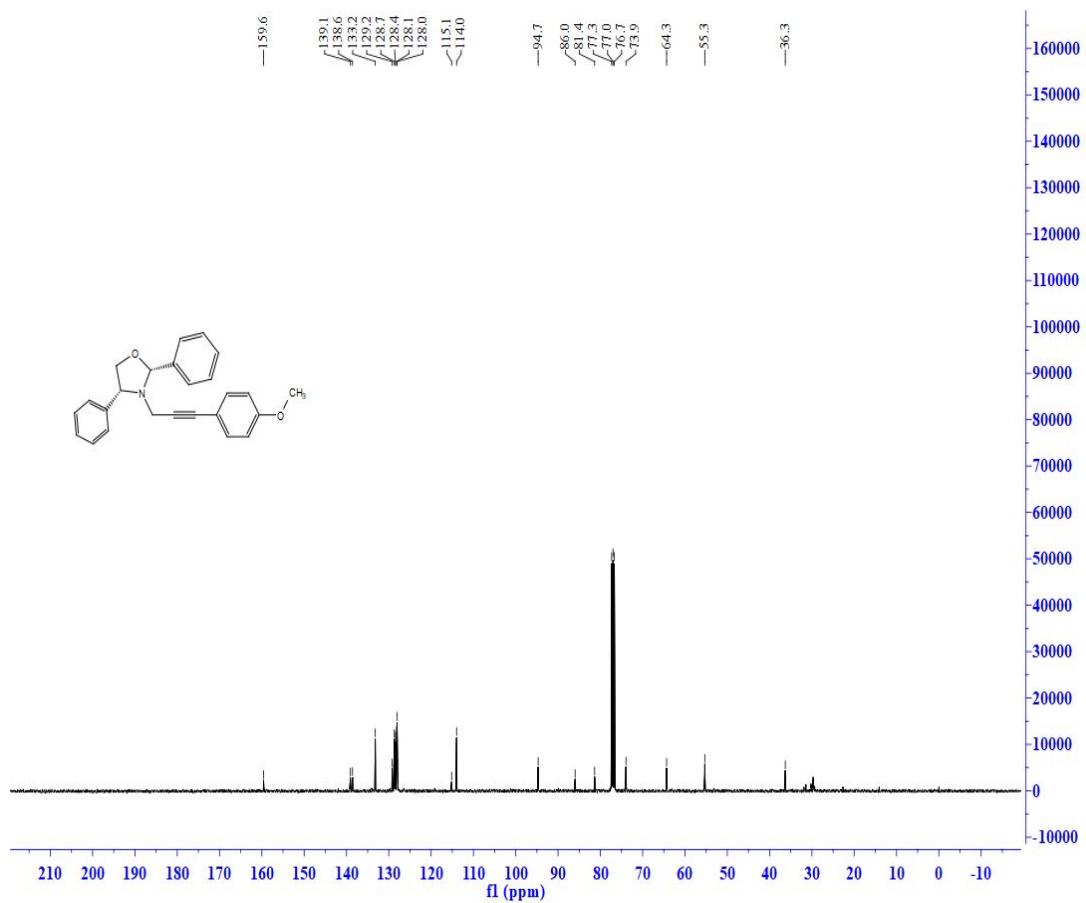
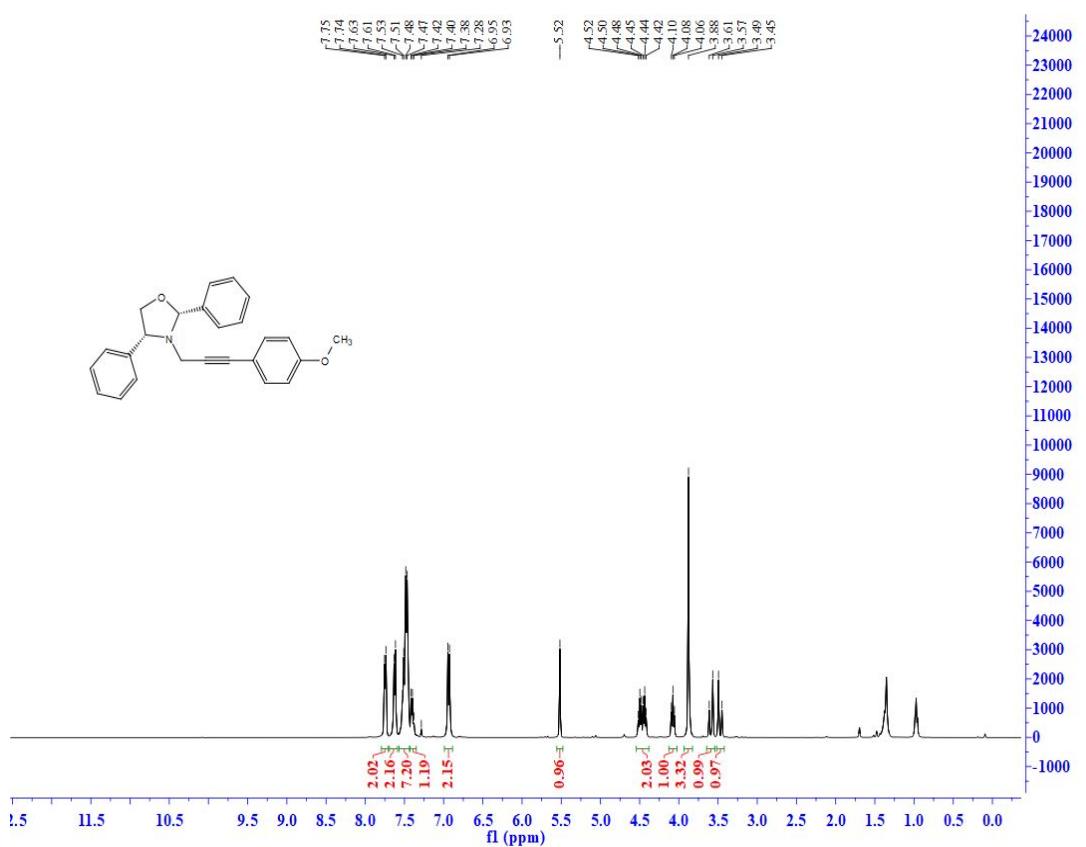
**(2*R*,4*R*)-3-(3-(4-ethylphenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5j)**



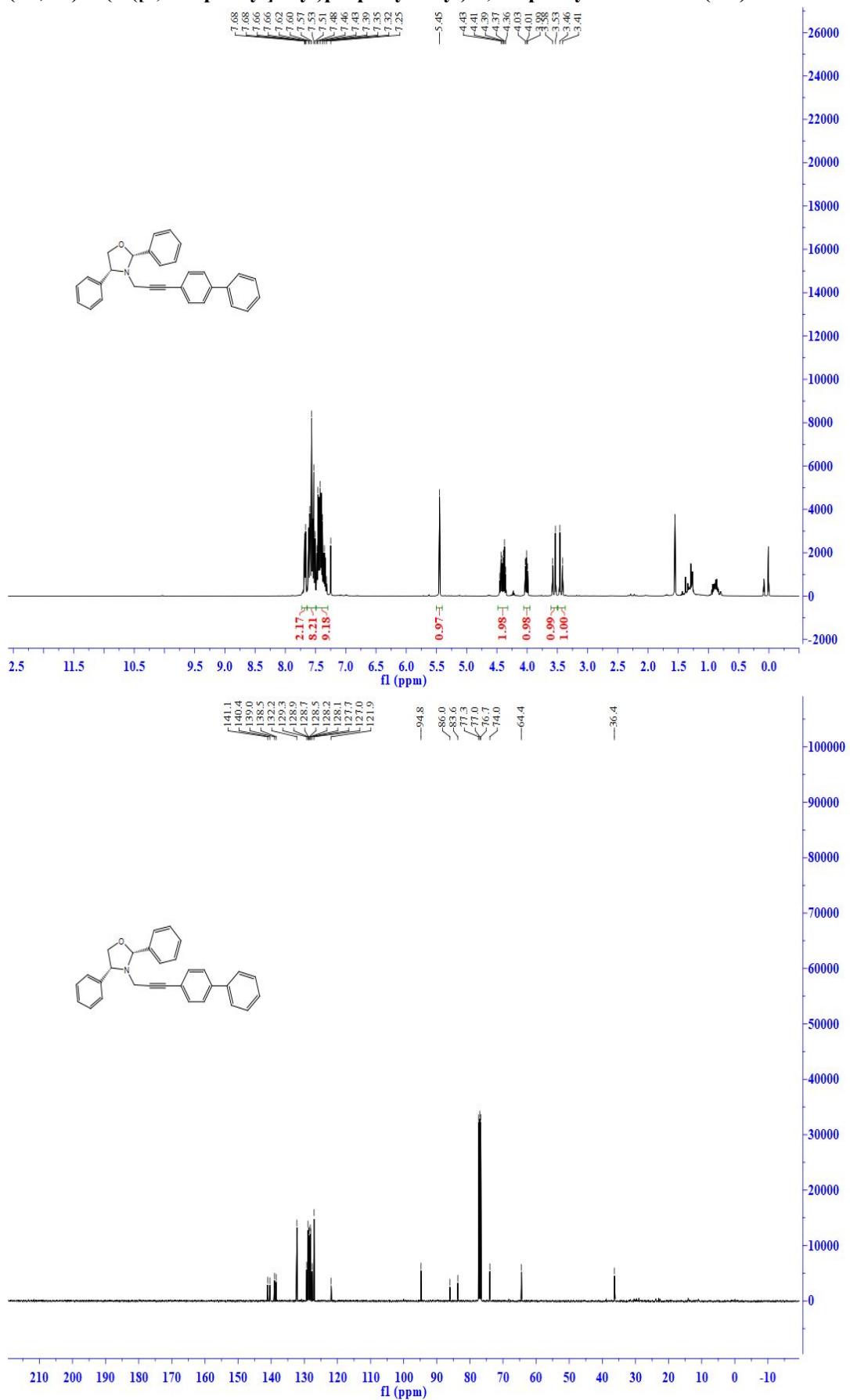
(2*R*,4*R*)-3-(3-(4-(tert-butyl)phenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5k)



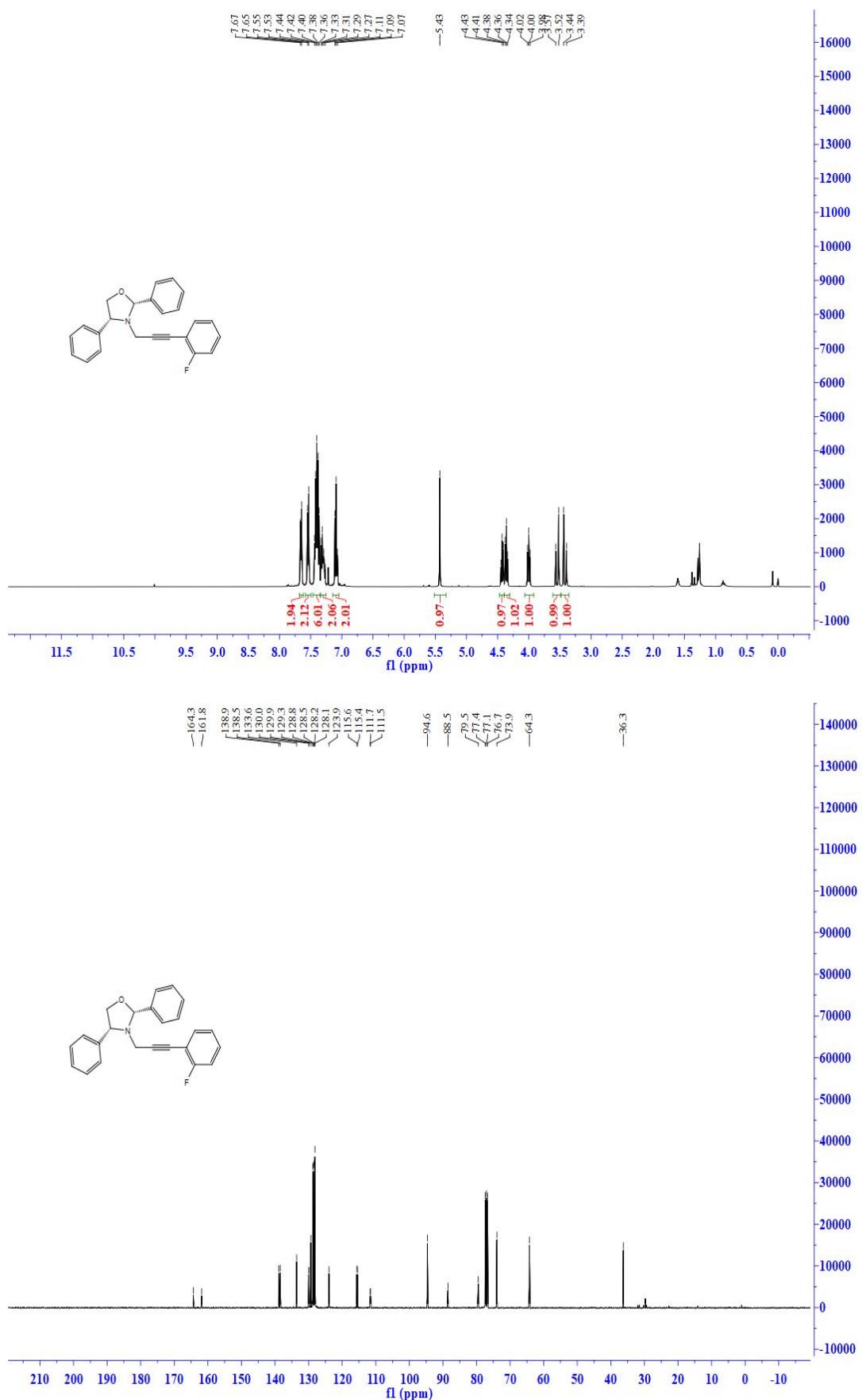
(2*R*,4*R*)-3-(3-(4-methoxyphenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5l)



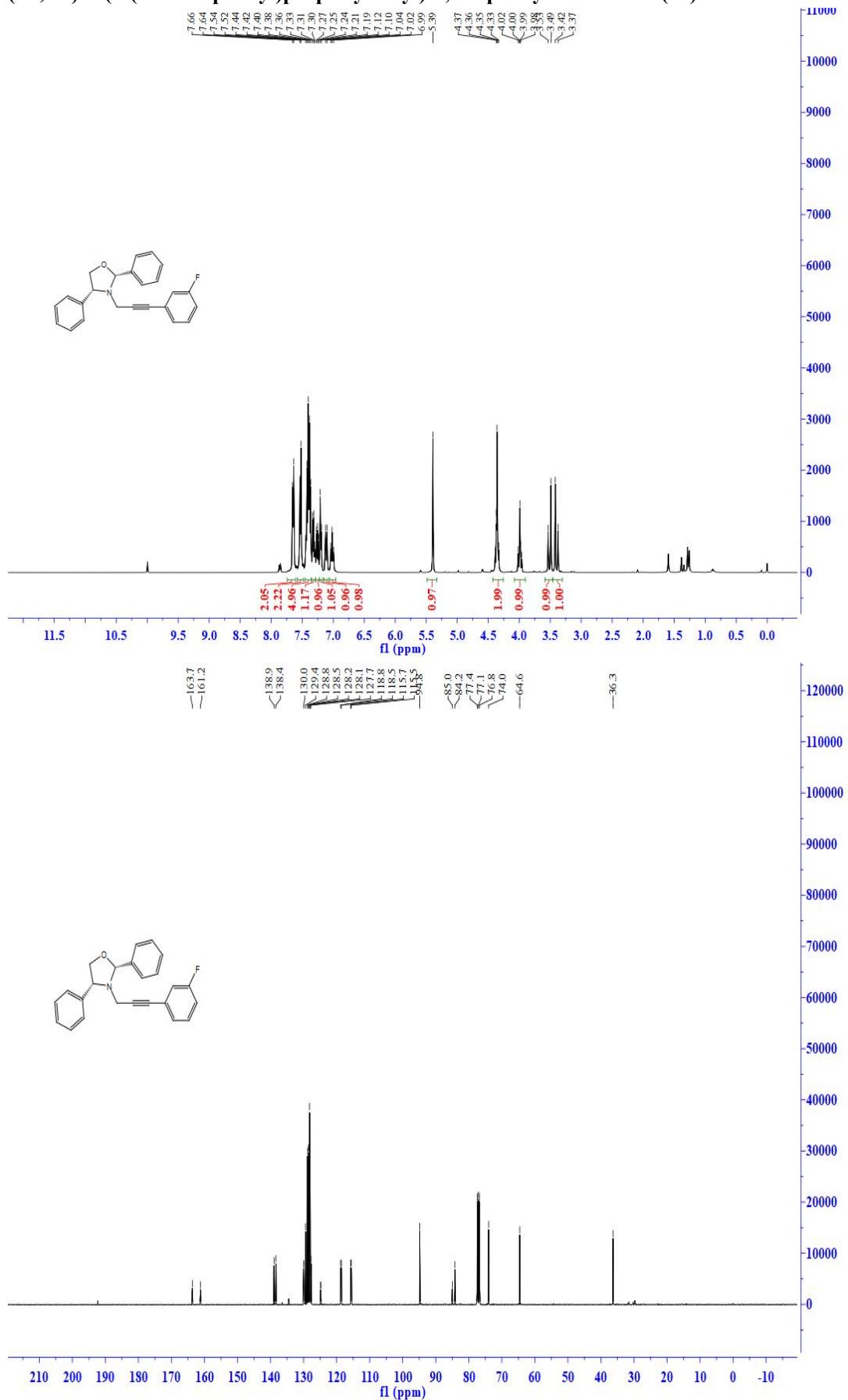
(2*R*,4*R*)-3-(3-([1,1'-biphenyl]-4-yl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5m)



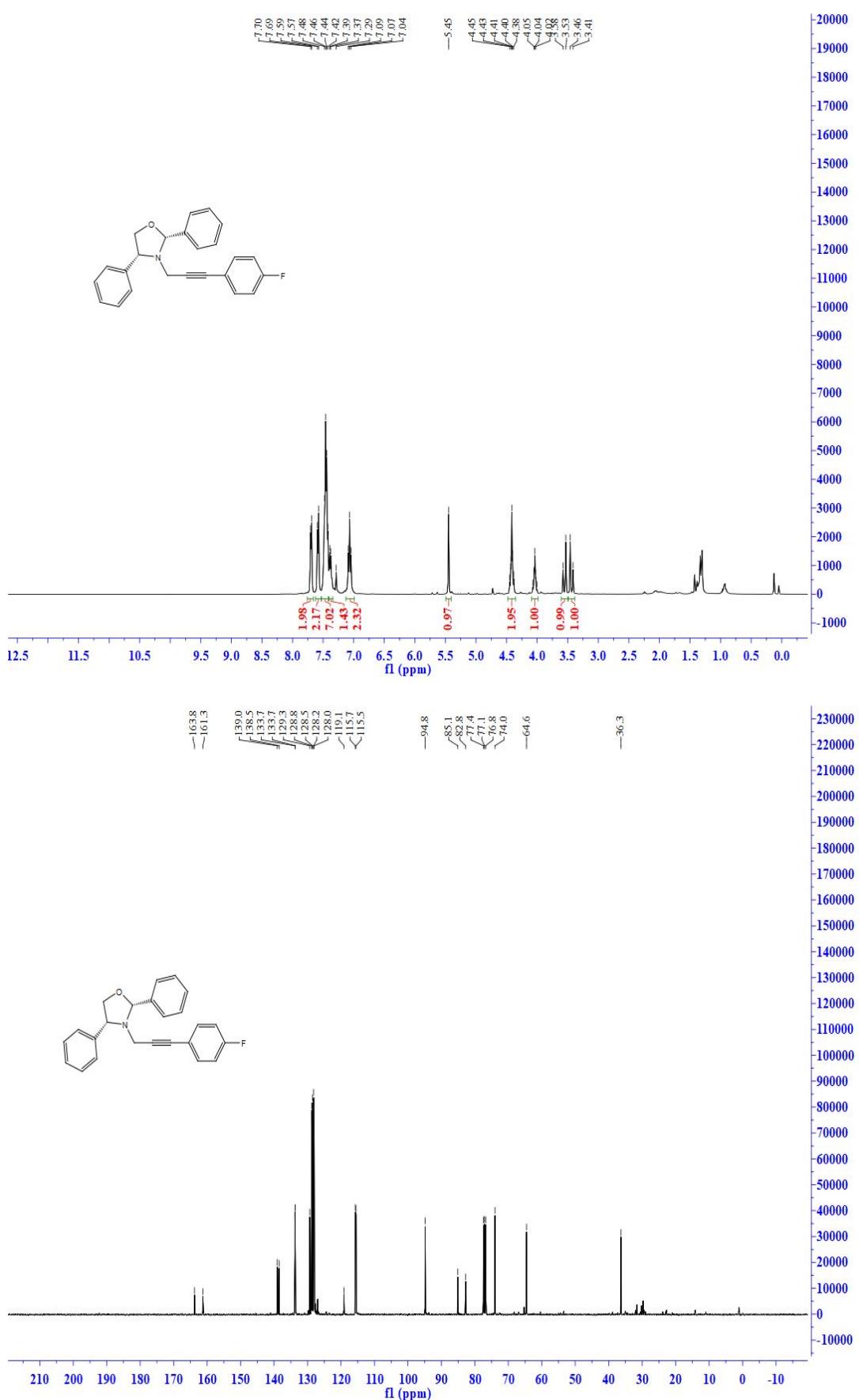
**(2*R*,4*R*)-3-(3-(2-fluorophenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5n)**



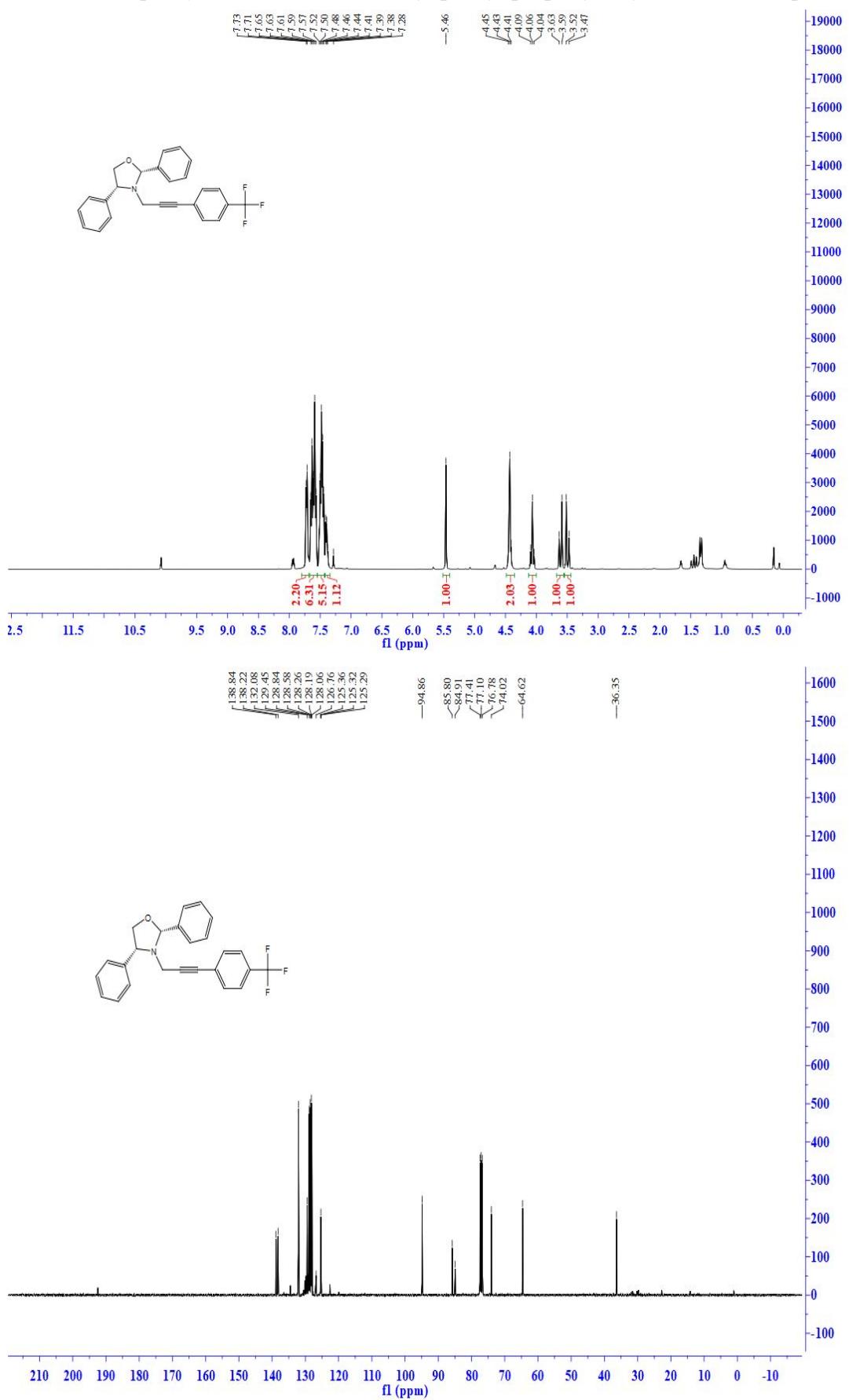
**(2*R*,4*R*)-3-(3-(3-fluorophenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5o)**



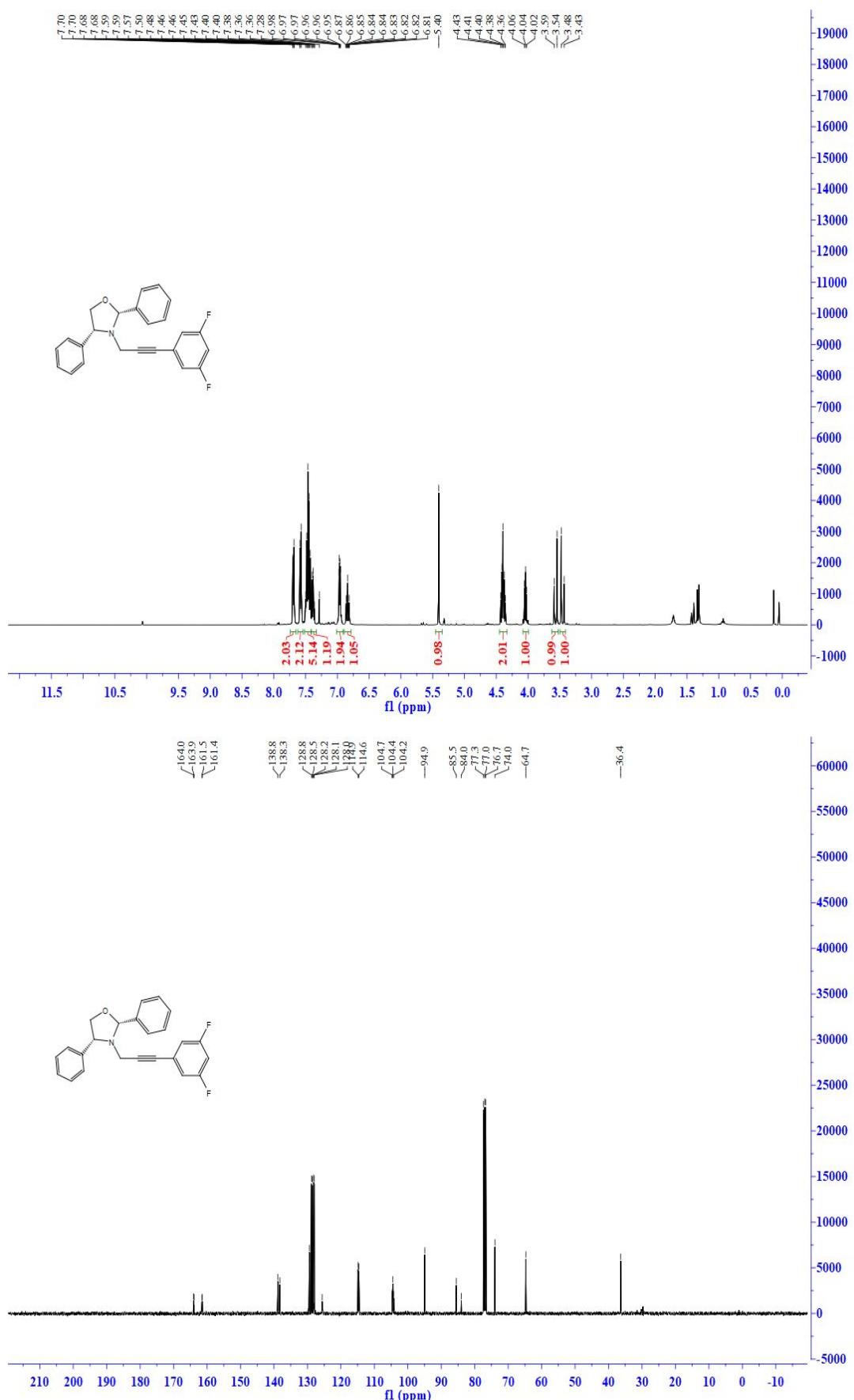
**(2*R*,4*R*)-3-(3-(4-fluorophenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5p)**



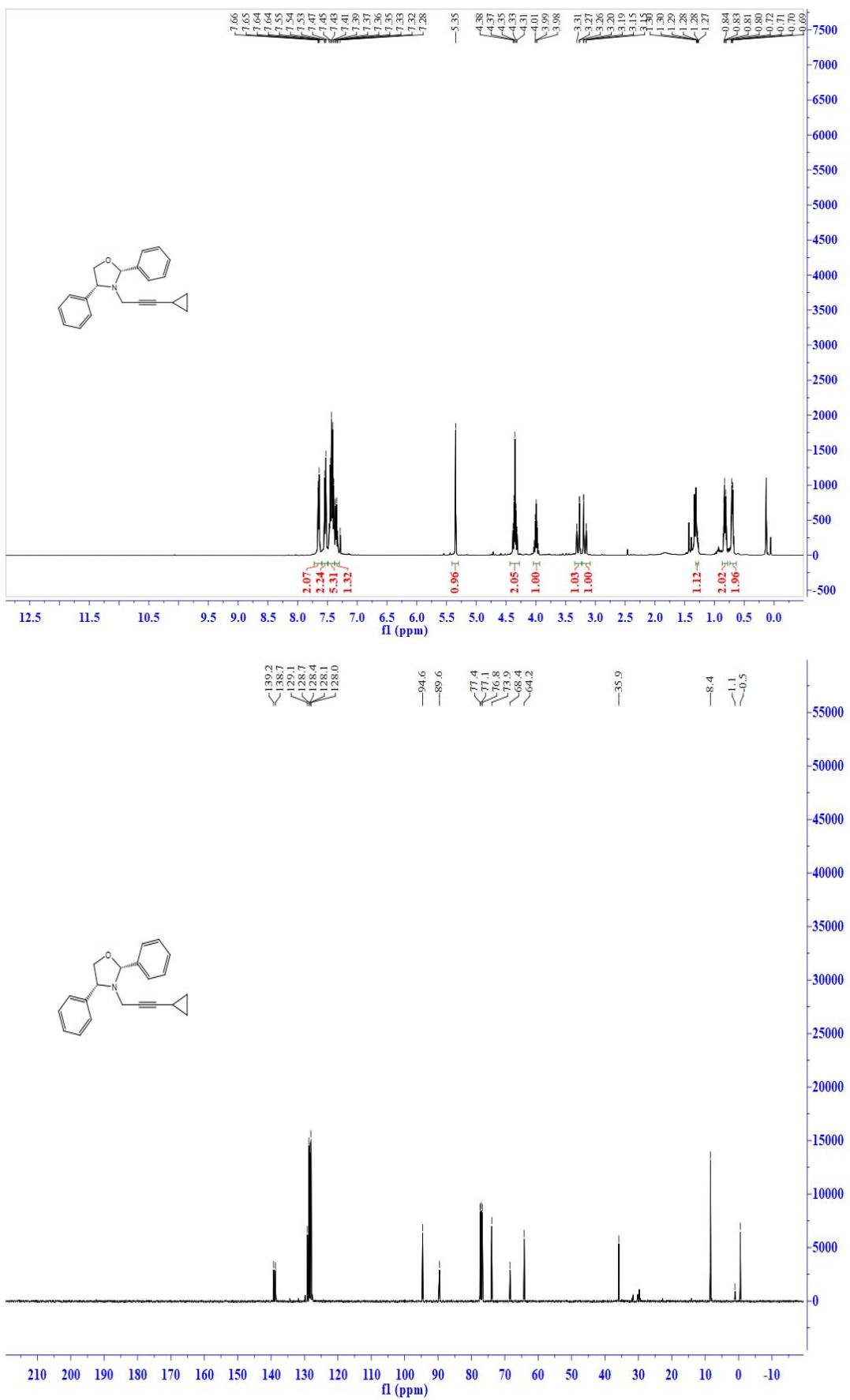
**(2*R*,4*R*)-2,4-diphenyl-3-(3-(4-(trifluoromethyl)phenyl)prop-2-yn-1-yl)oxazolididine (5q)**



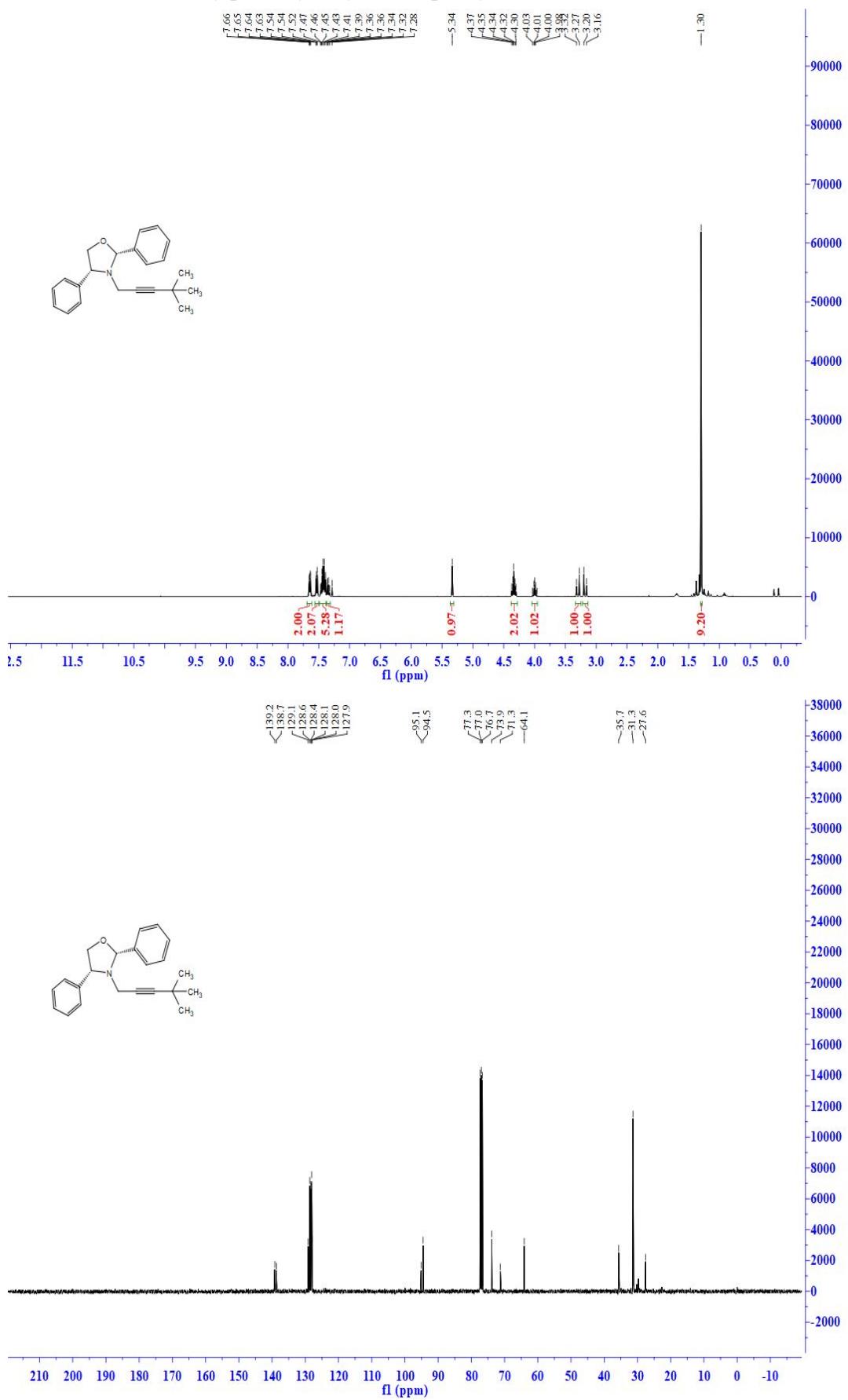
**(2*R*,4*R*)-3-(3,5-difluorophenyl)prop-2-yn-1-yl)-2,4-diphenyloxazolidine (5r)**



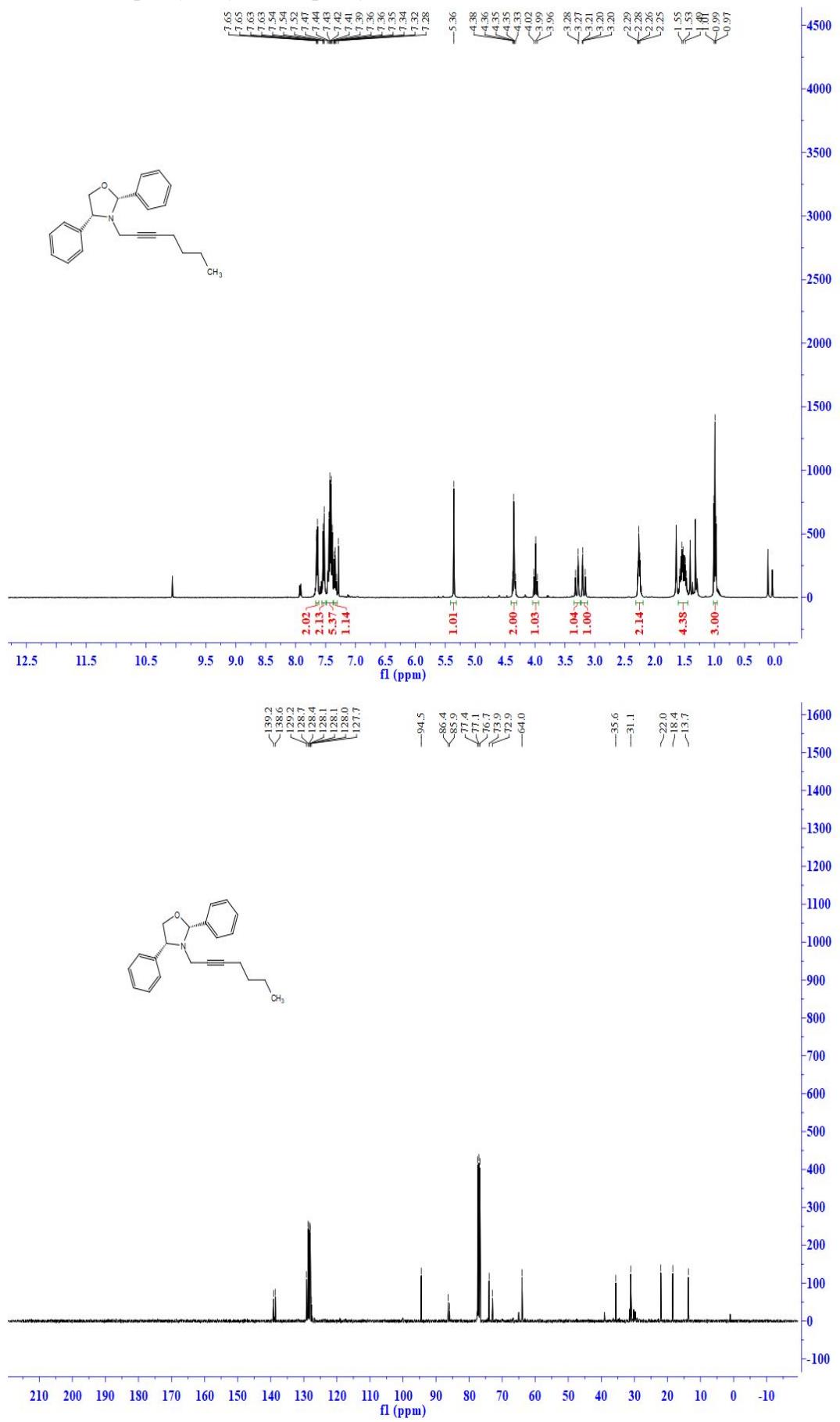
**(2*R*,4*R*)-3-(3-cyclopropylprop-2-yn-1-yl)-2,4-diphenyloxazolidine (5s)**



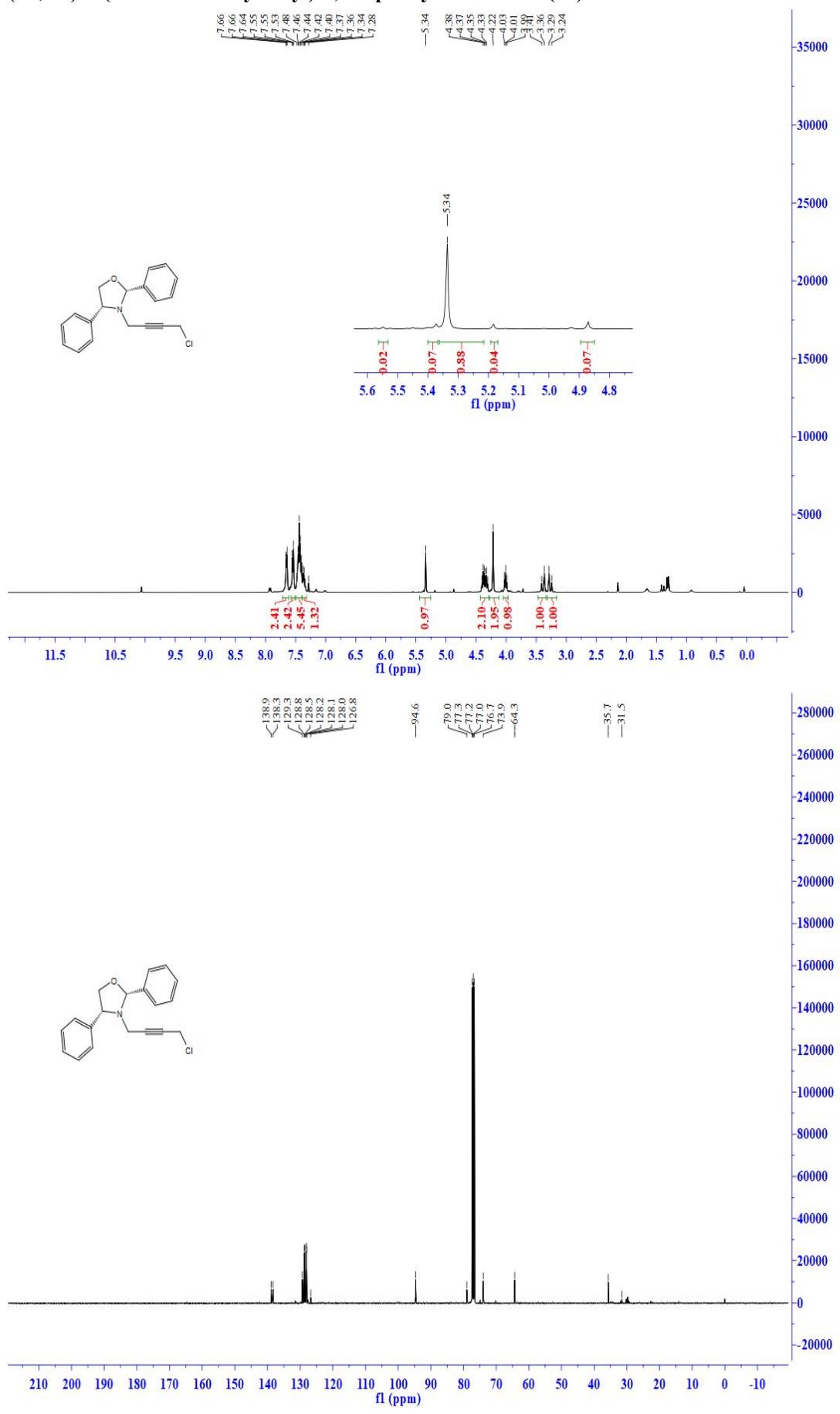
**(2*R*,4*R*)-3-(4,4-dimethylpent-2-yn-1-yl)-2,4-diphenyloxazolidine (5t)**



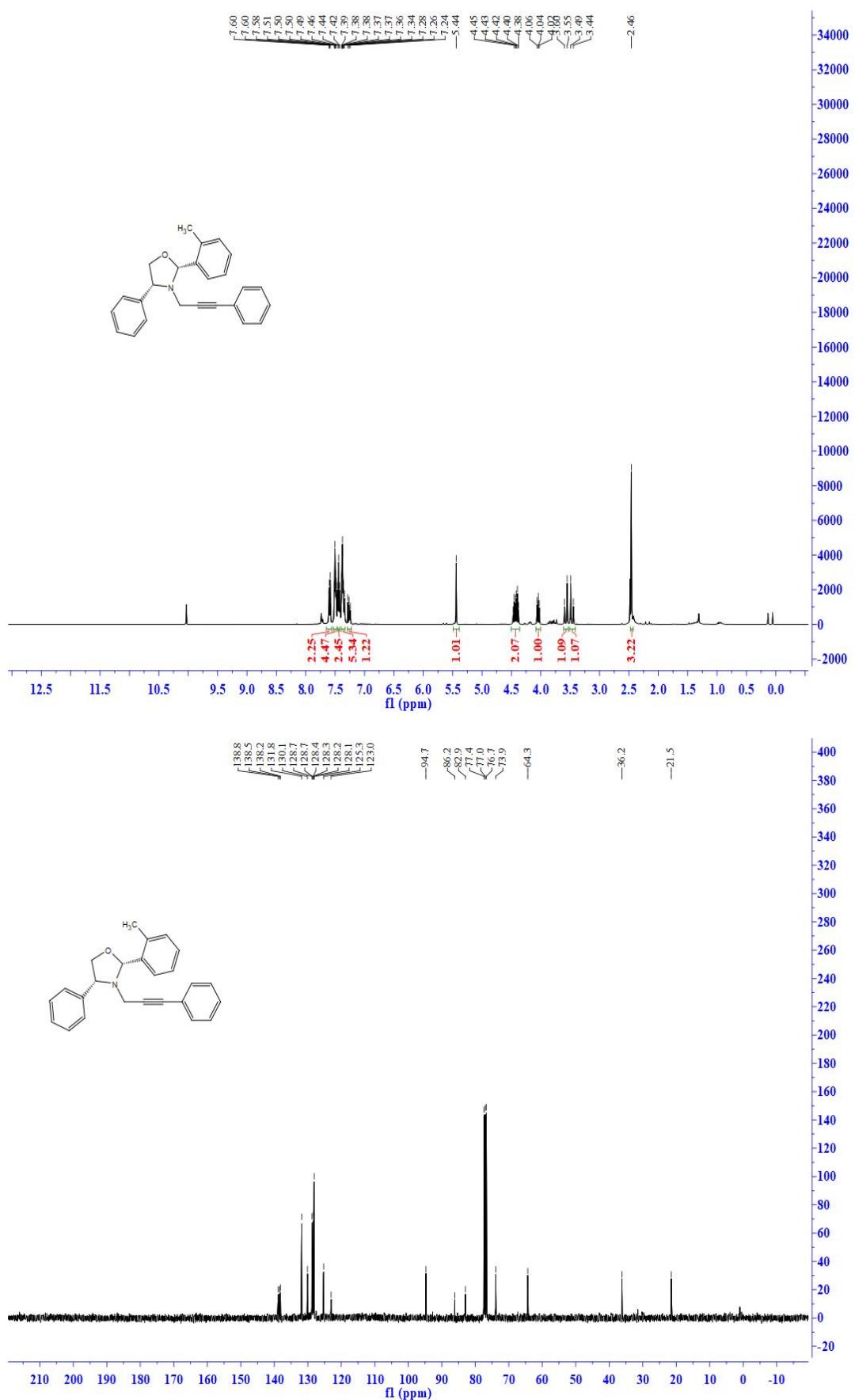
**(2*R*,4*R*)-3-(hept-2-yn-1-yl)-2,4-diphenyloxazolidine (5u)**



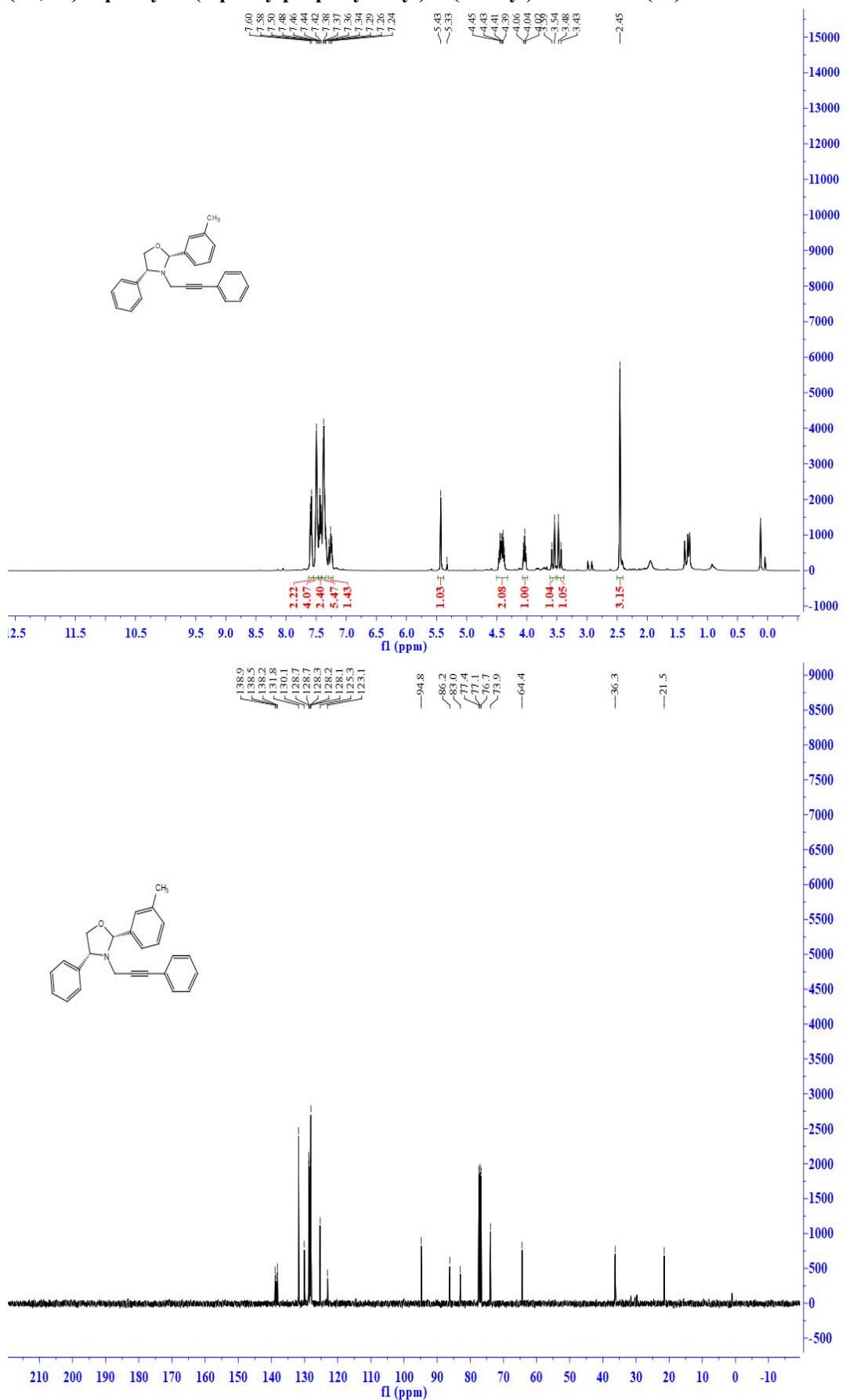
**(2*R*,4*R*)-3-(4-chlorobut-2-yn-1-yl)-2,4-diphenyloxazolidine (5v)**



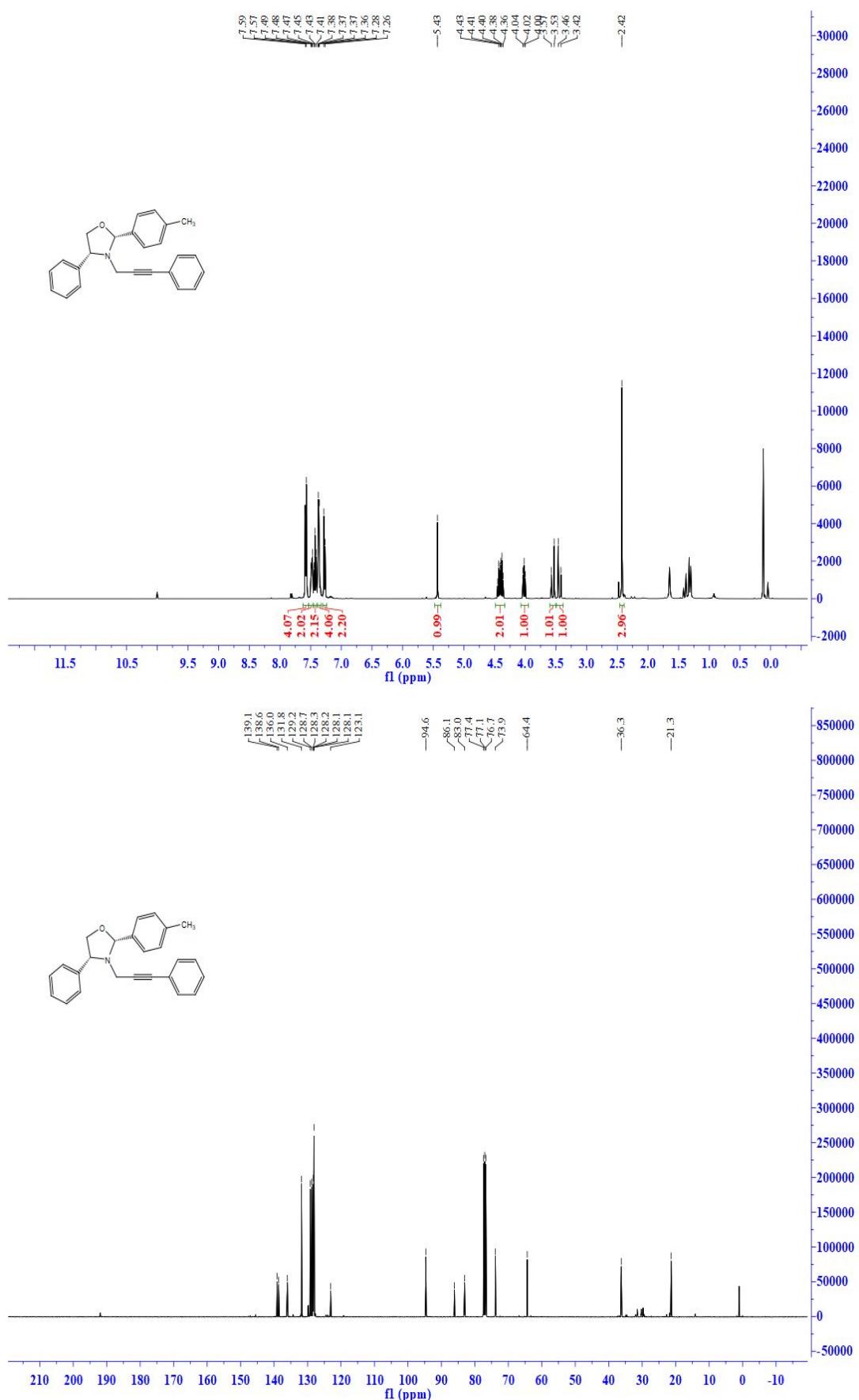
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(o-tolyl)oxazolidine (5w)**



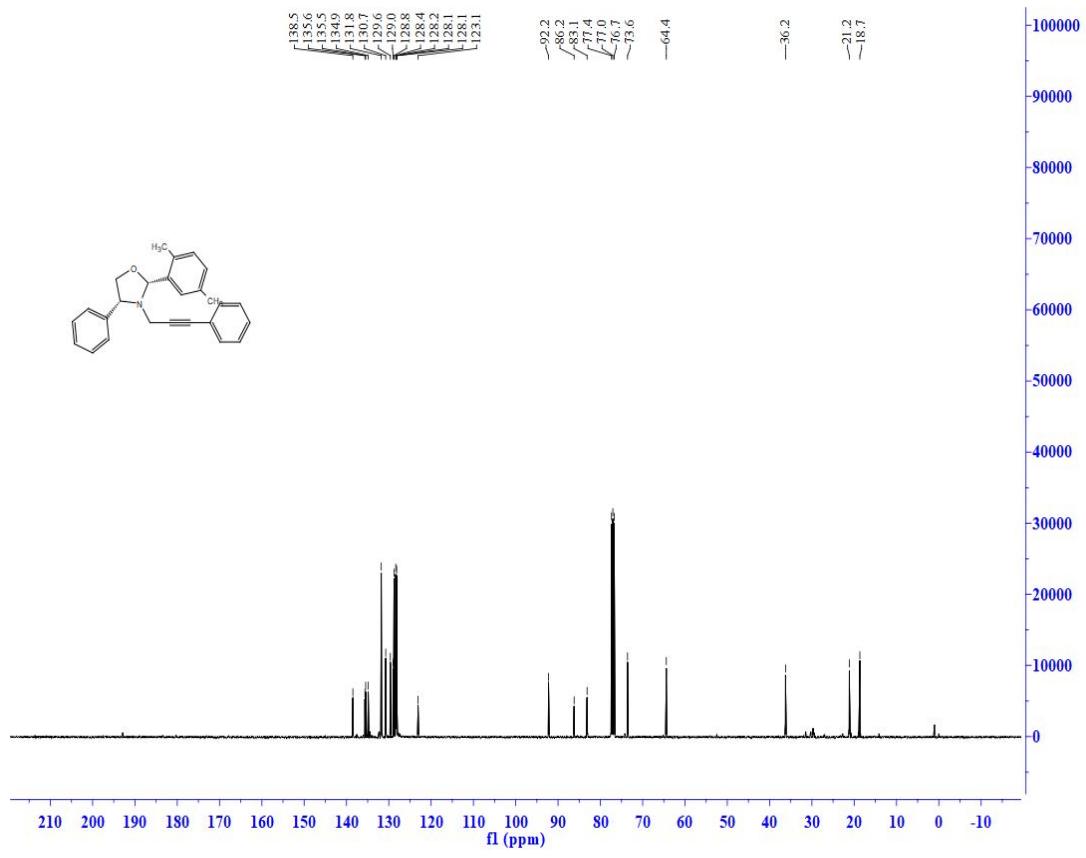
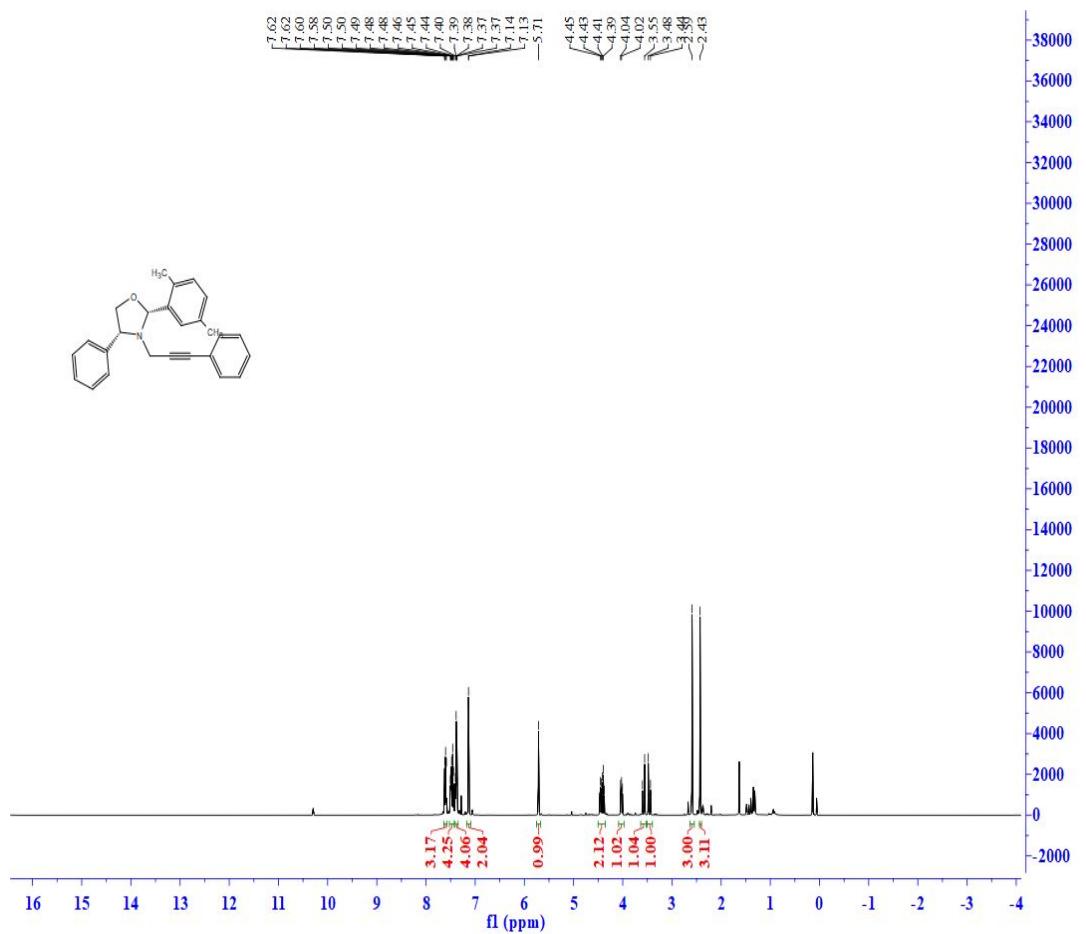
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(m-tolyl)oxazolidine (5x)**



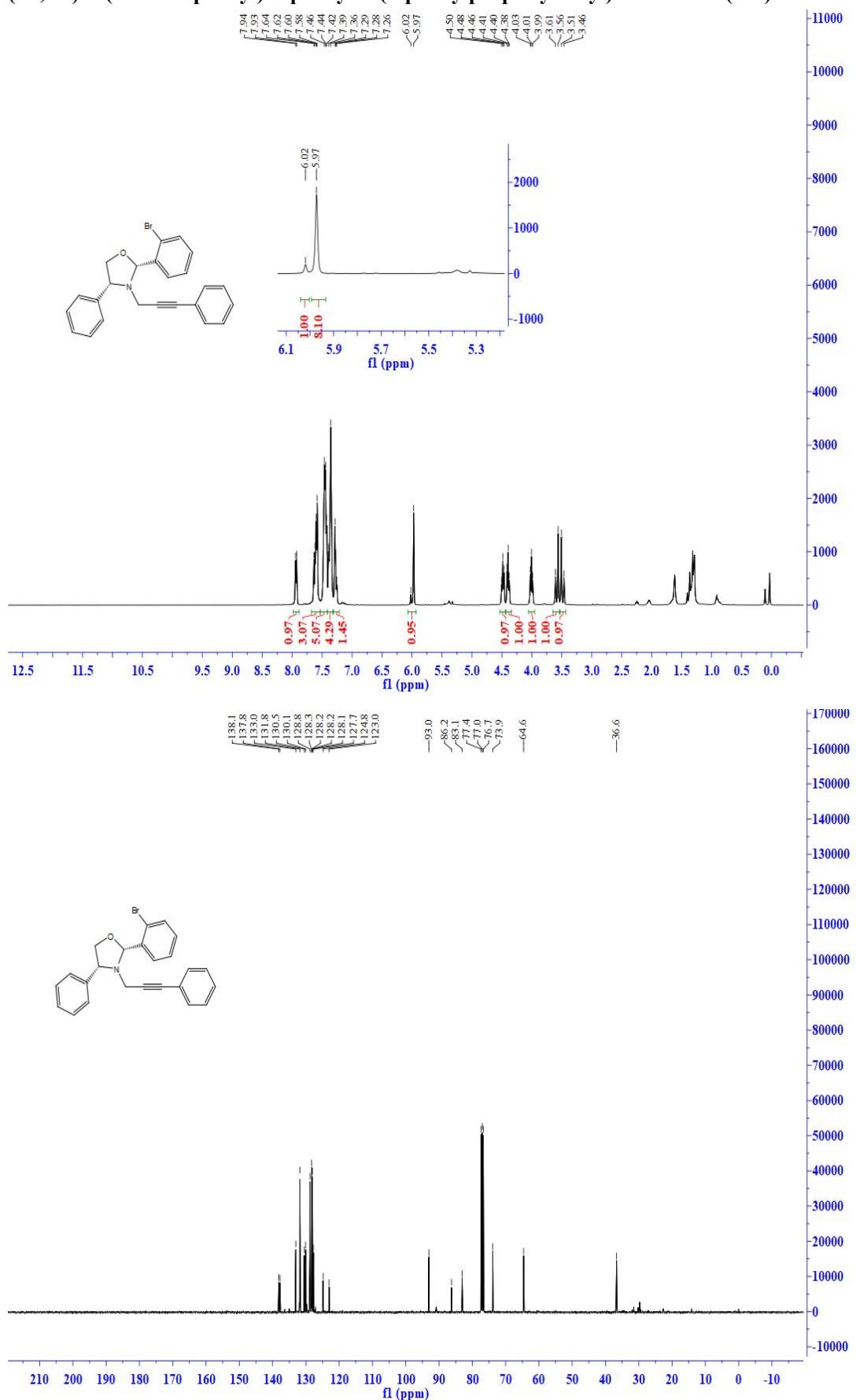
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(p-tolyl)oxazolidine (5y)**



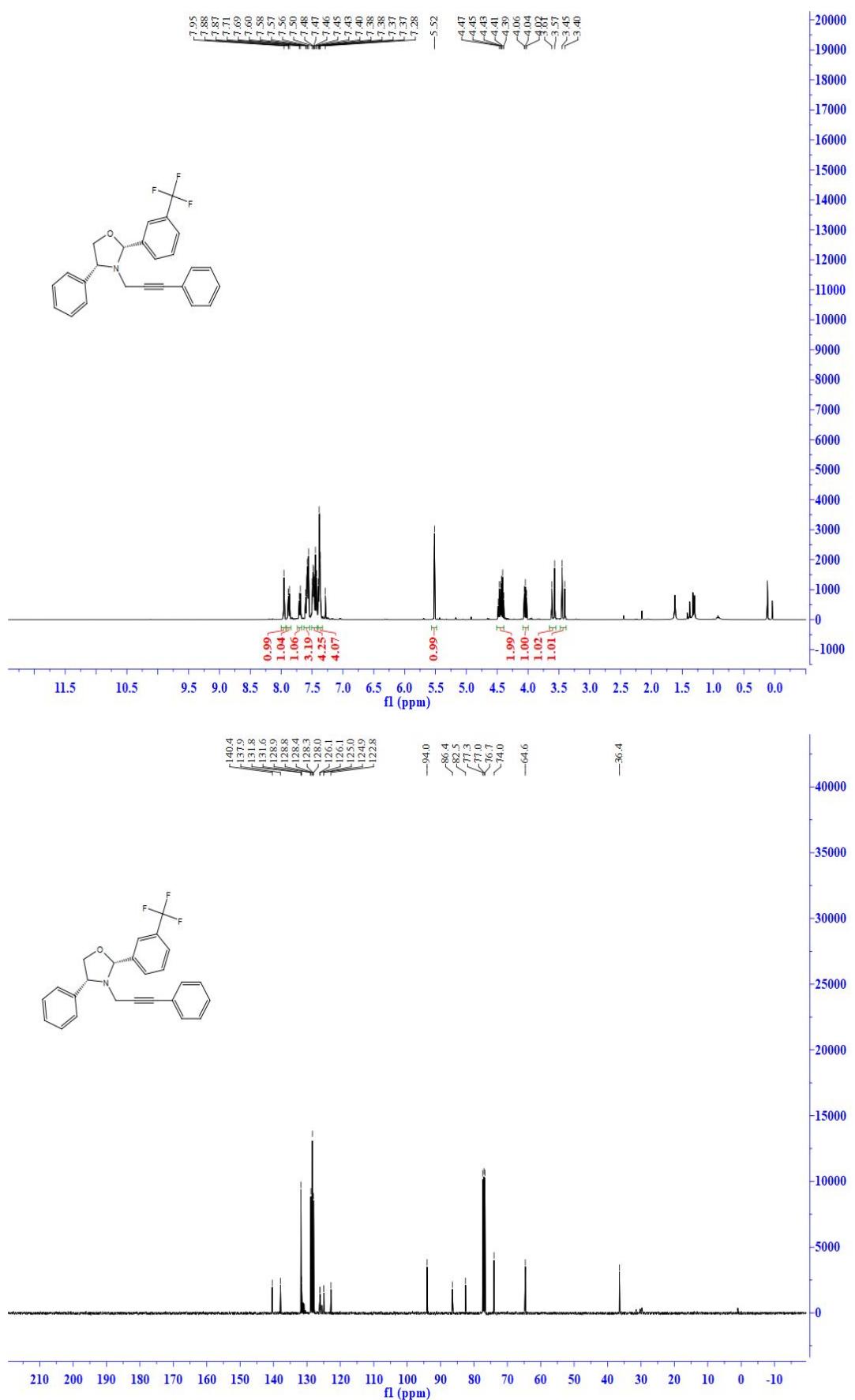
(2*R*,4*R*)-2-(2,5-dimethylphenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5z)



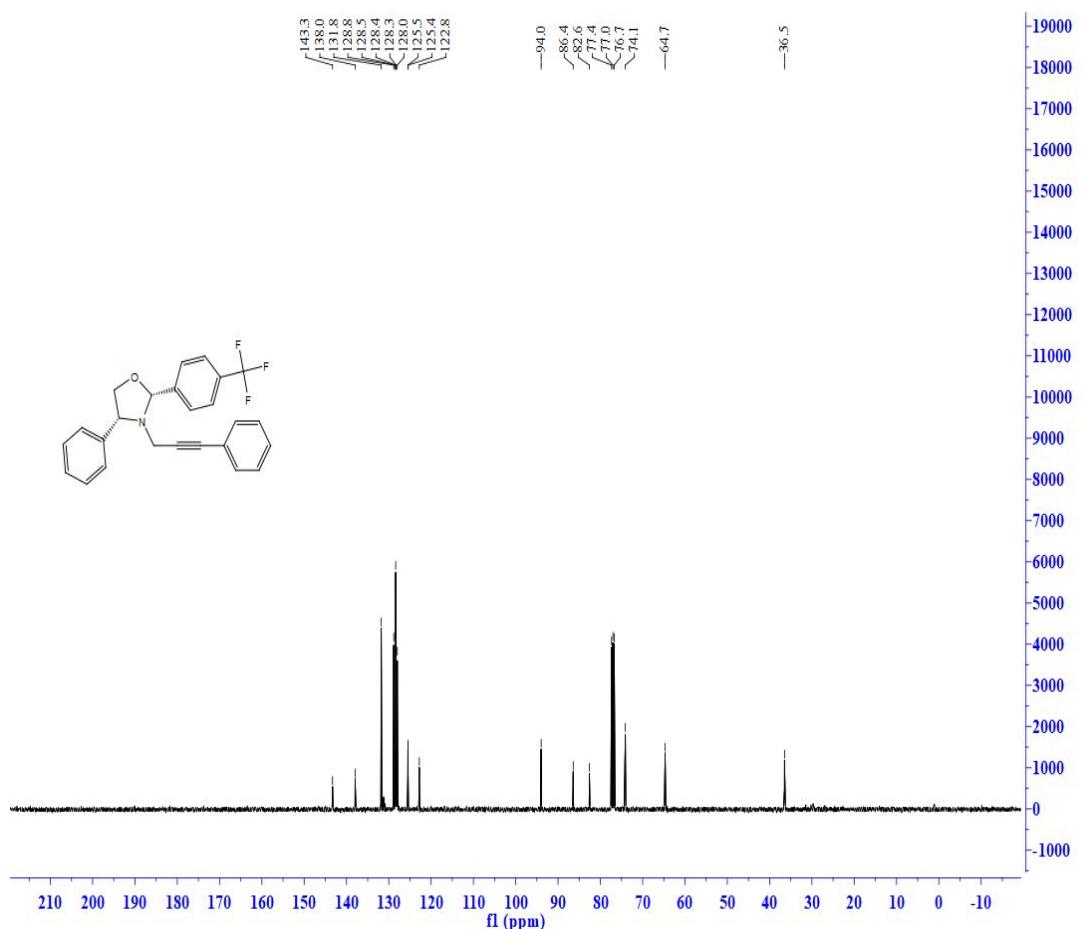
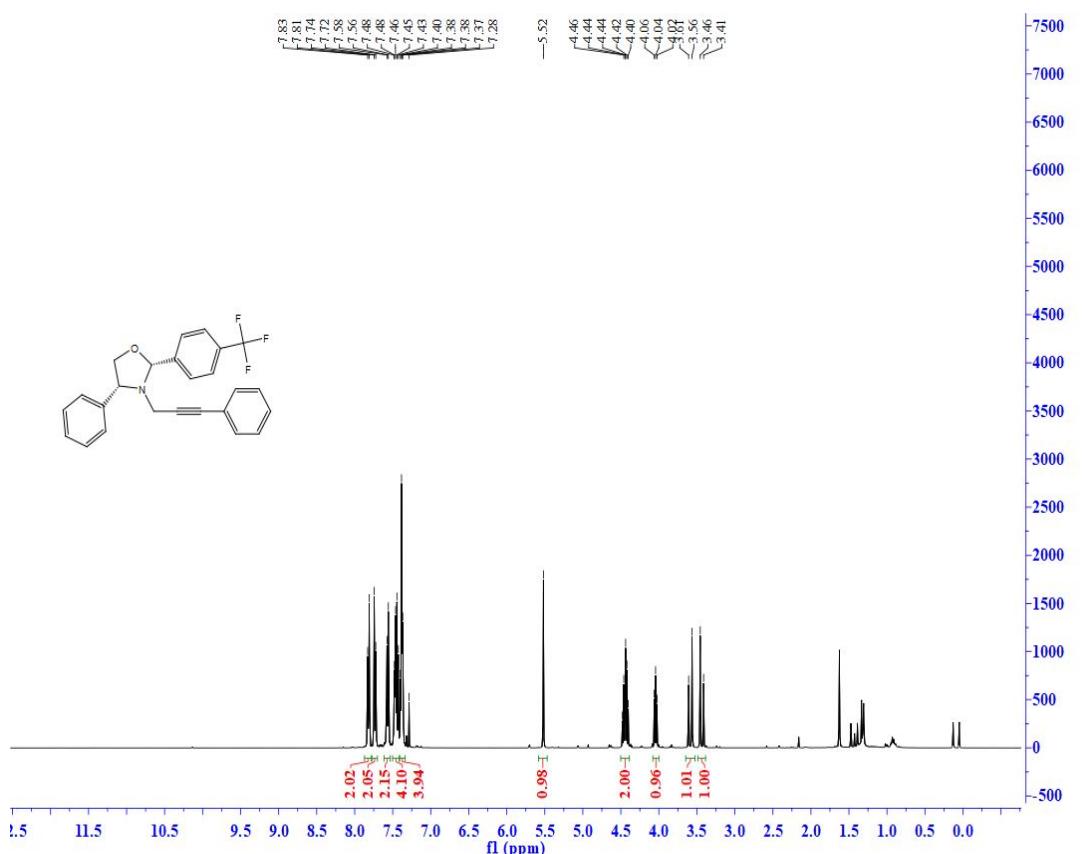
(2*R*,4*R*)-2-(2-bromophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5za)



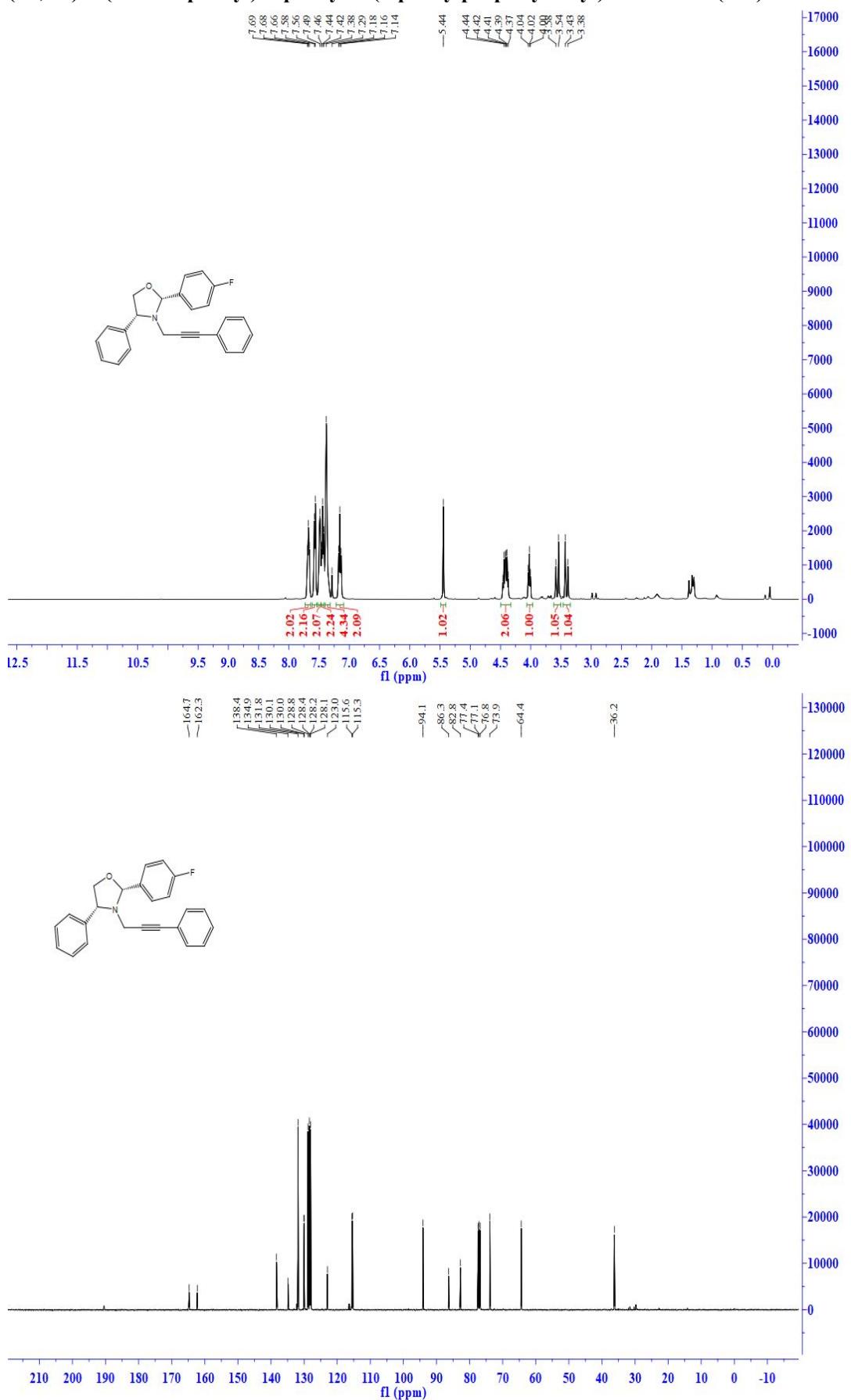
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(3-(trifluoromethyl)phenyl)oxazolidine (5zb)**



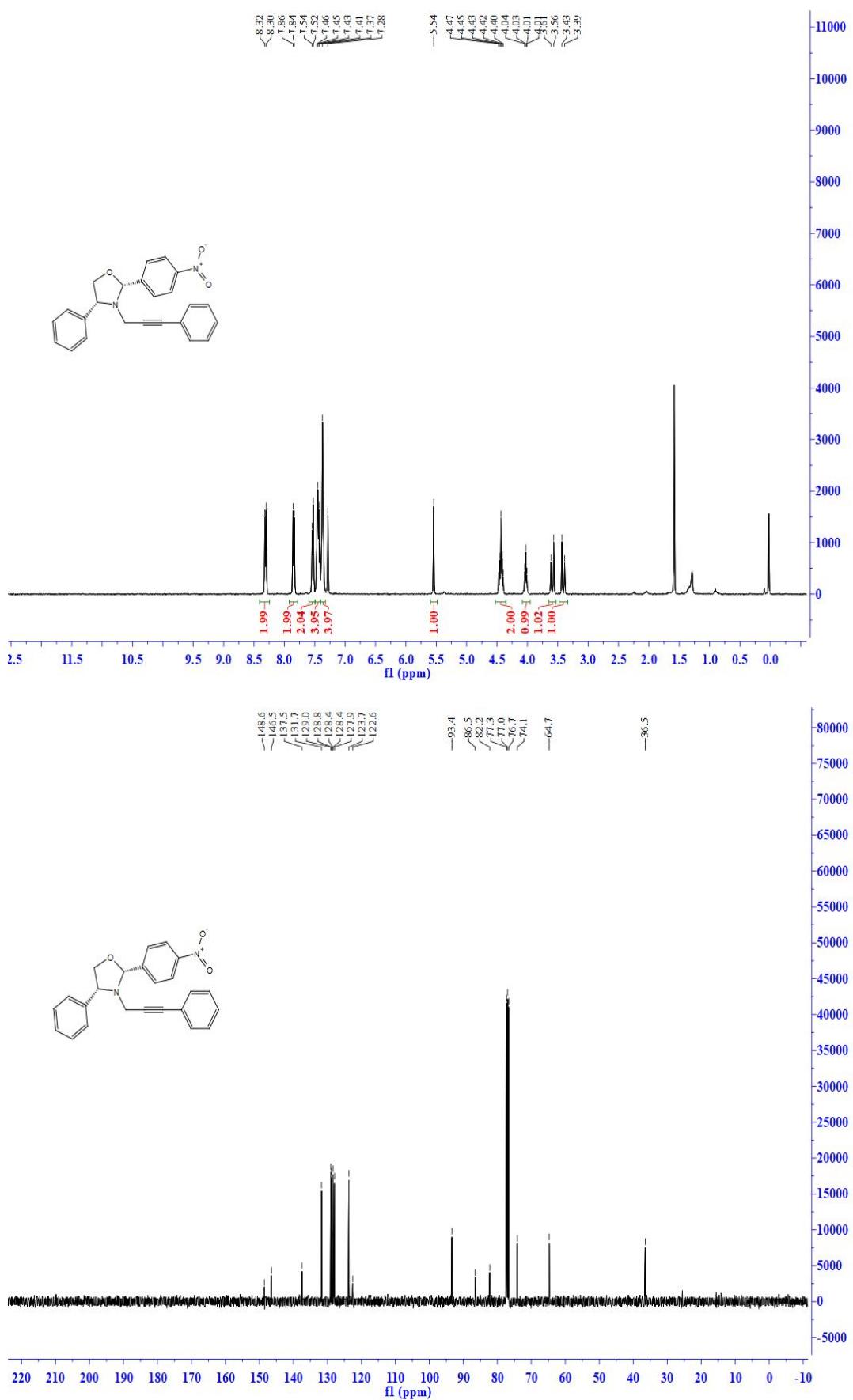
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(4-(trifluoromethyl)phenyl)oxazolidine (5zc)**



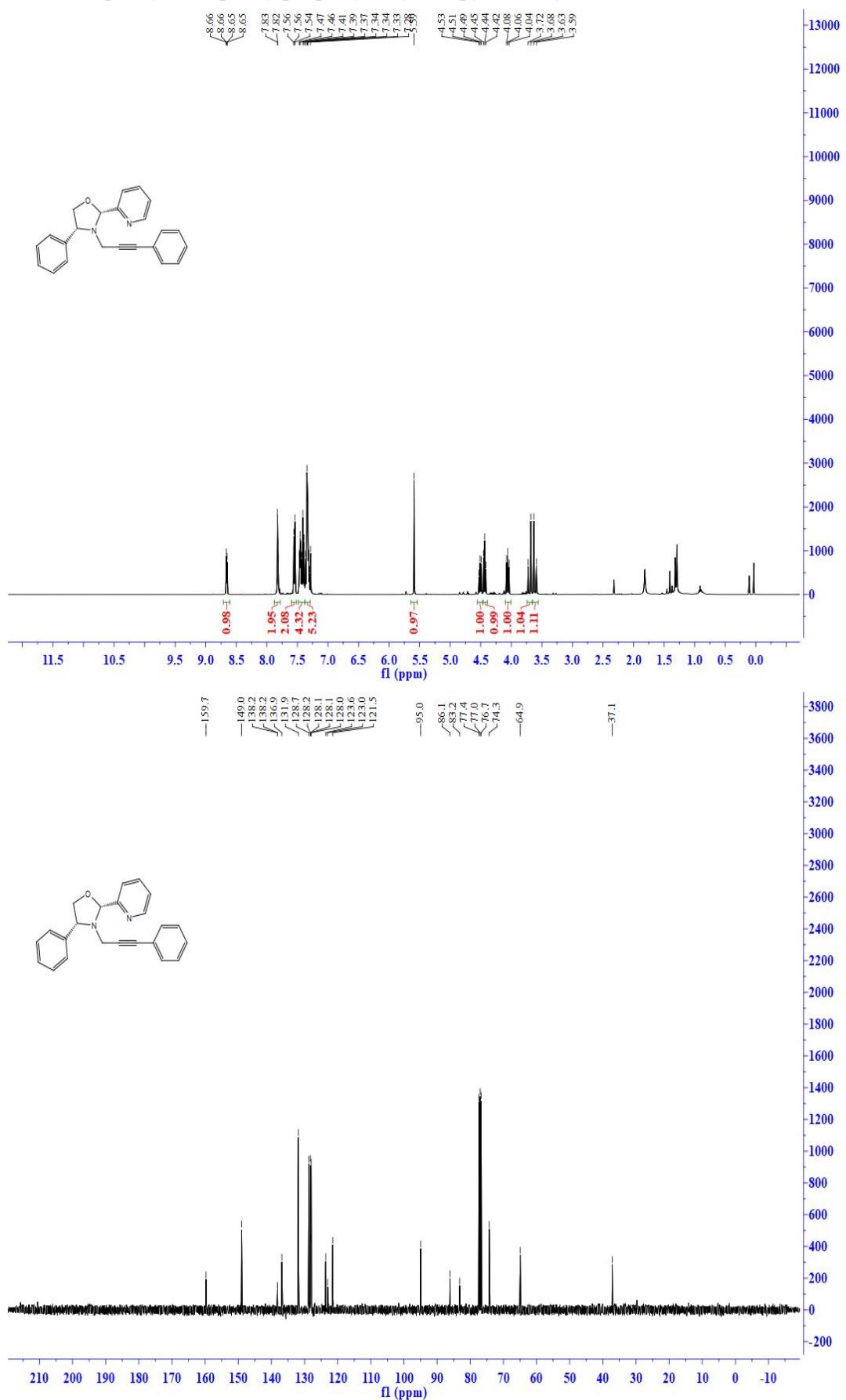
**(2*R*,4*R*)-2-(4-fluorophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zd)**



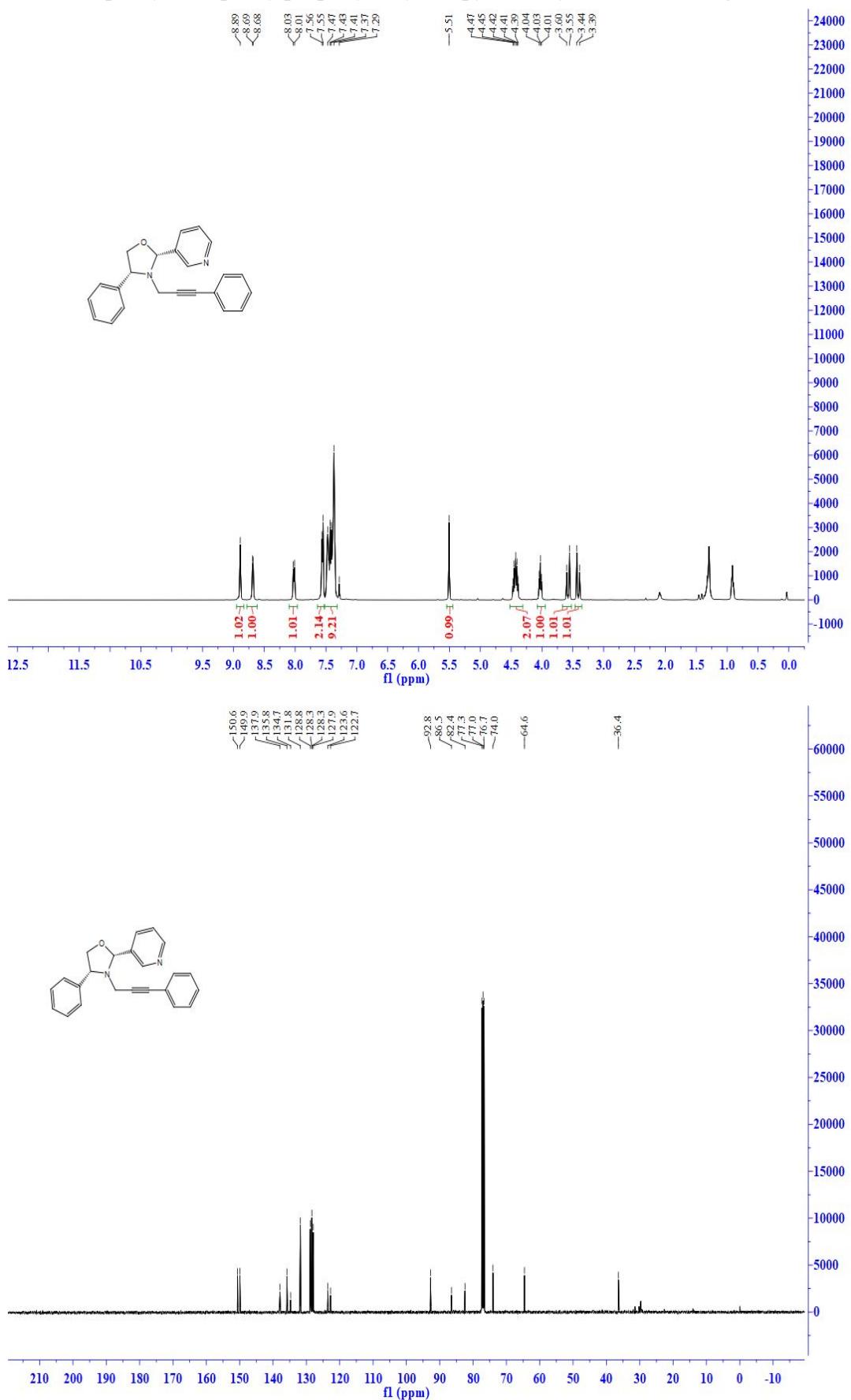
(2*R*,4*R*)-2-(4-nitrophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5ze)



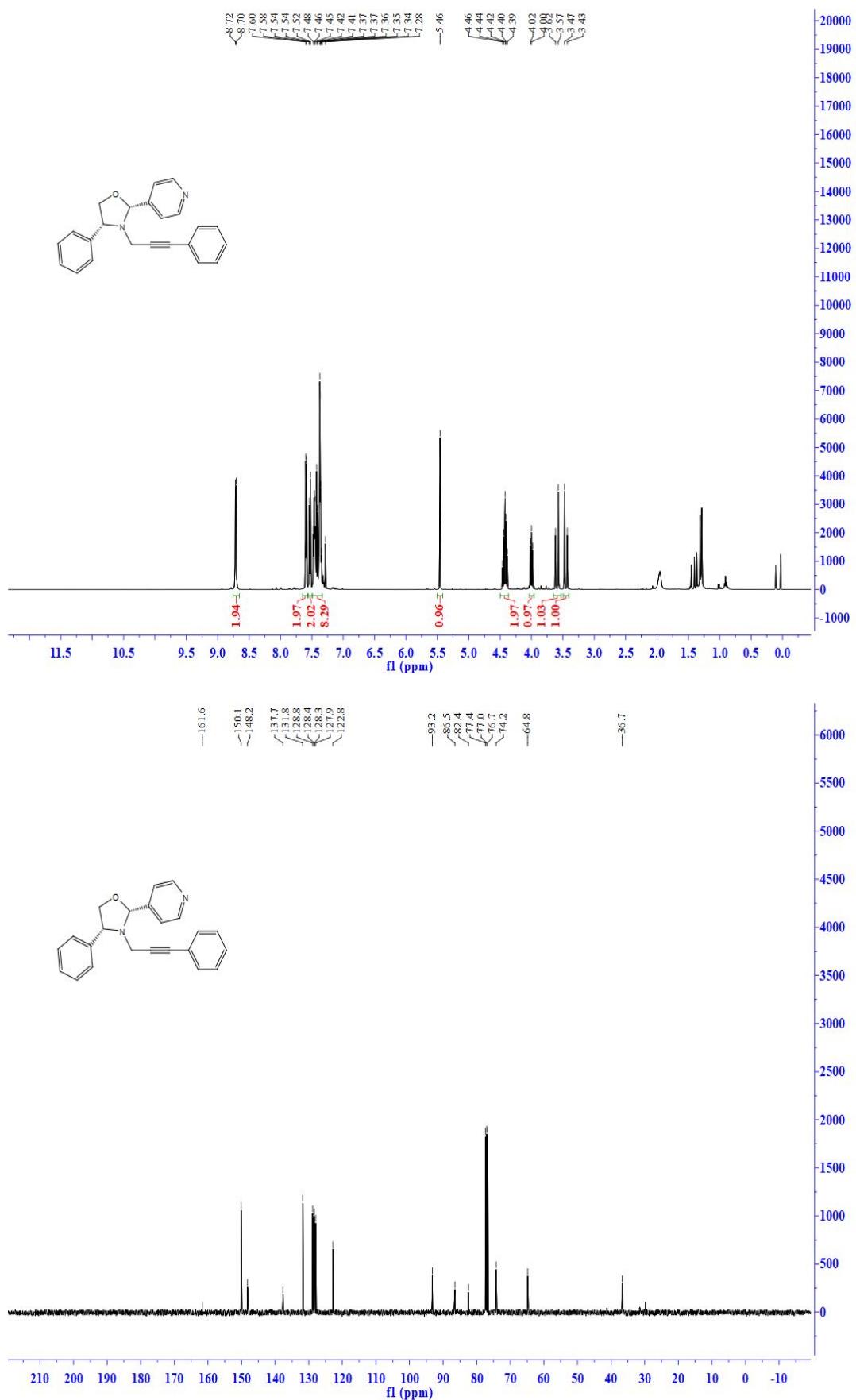
(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(pyridin-2-yl)oxazolidine (5zf)



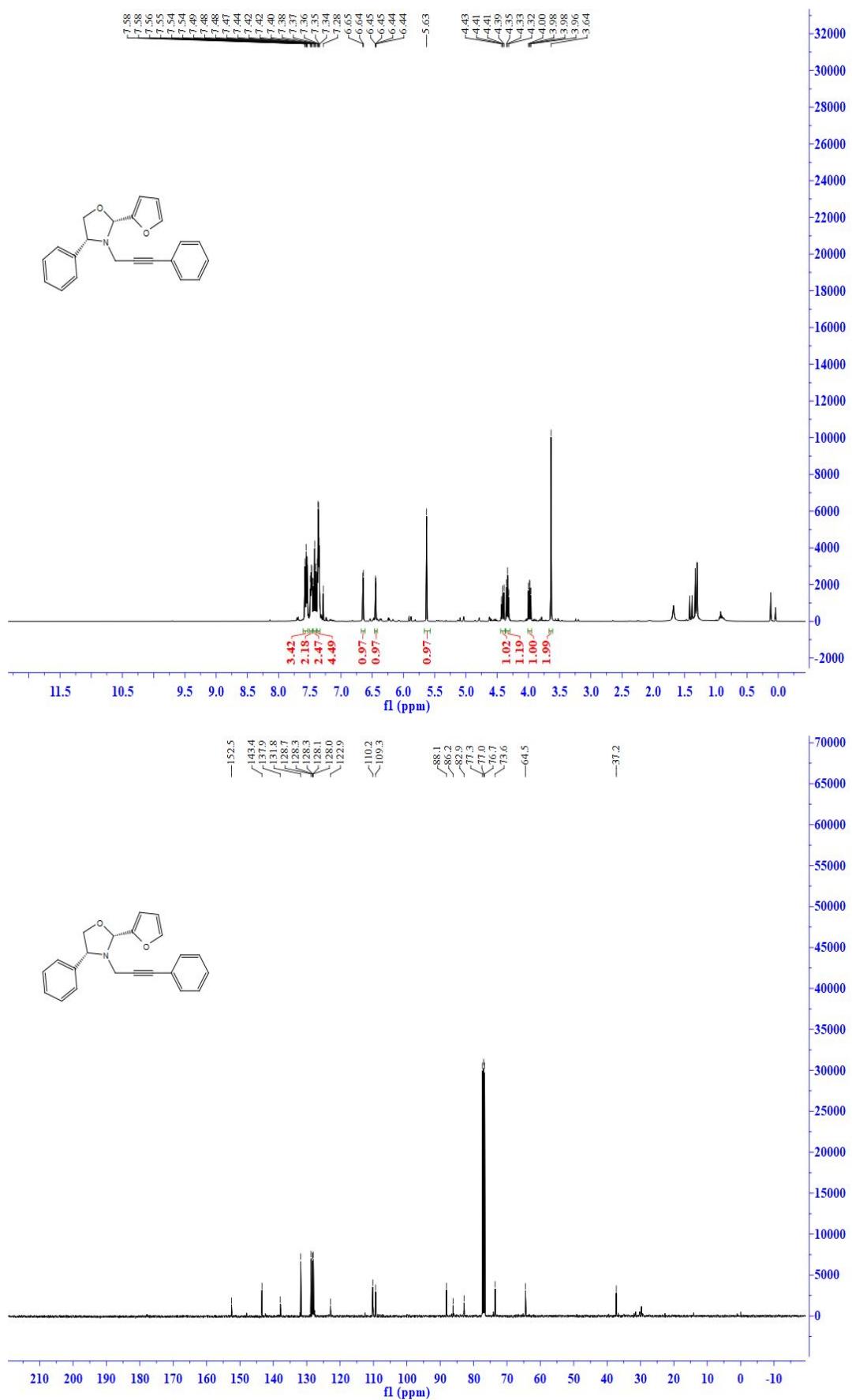
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(pyridin-3-yl)oxazolidine (5zg)**



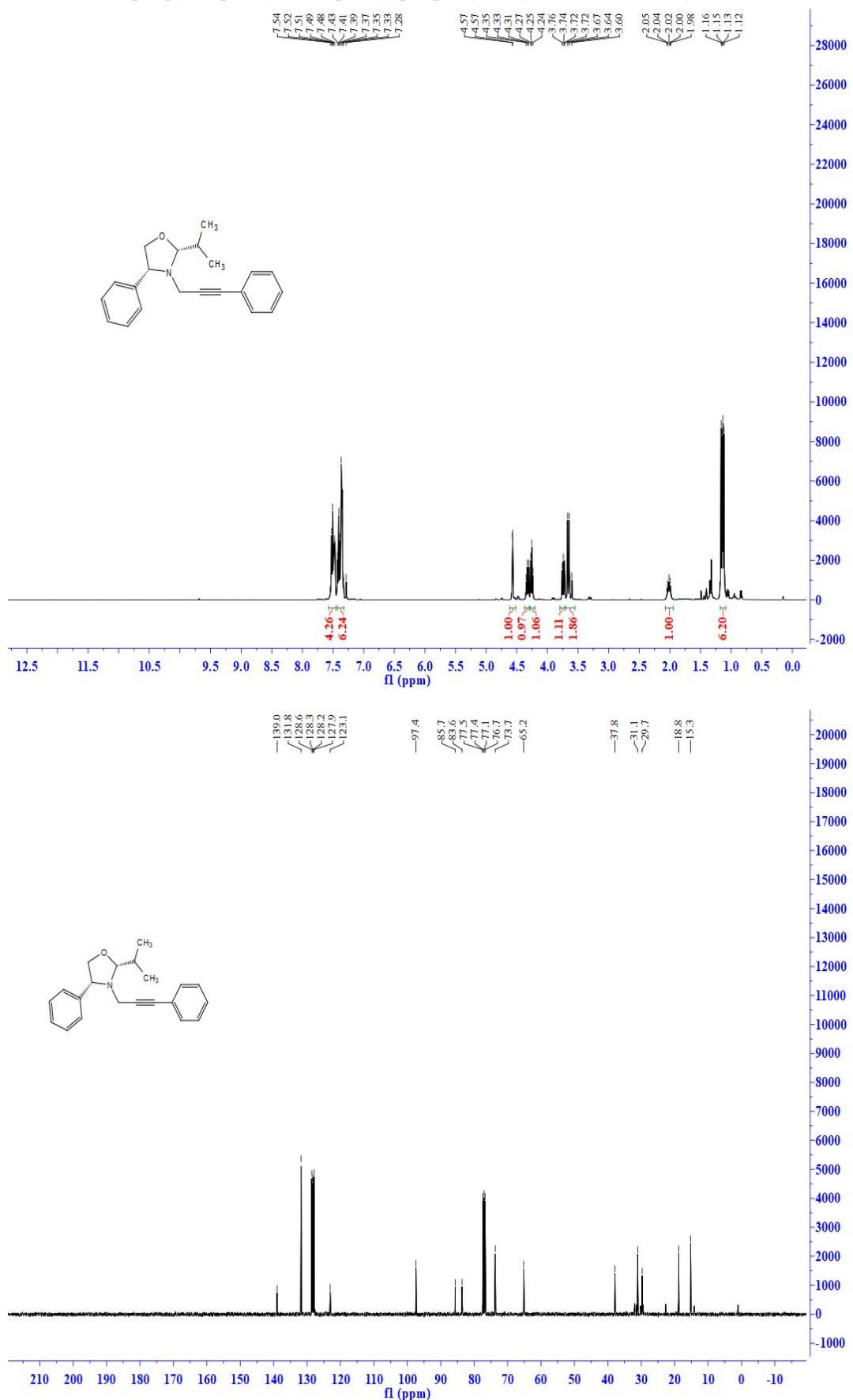
**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(pyridin-4-yl)oxazolidine (5zh)**



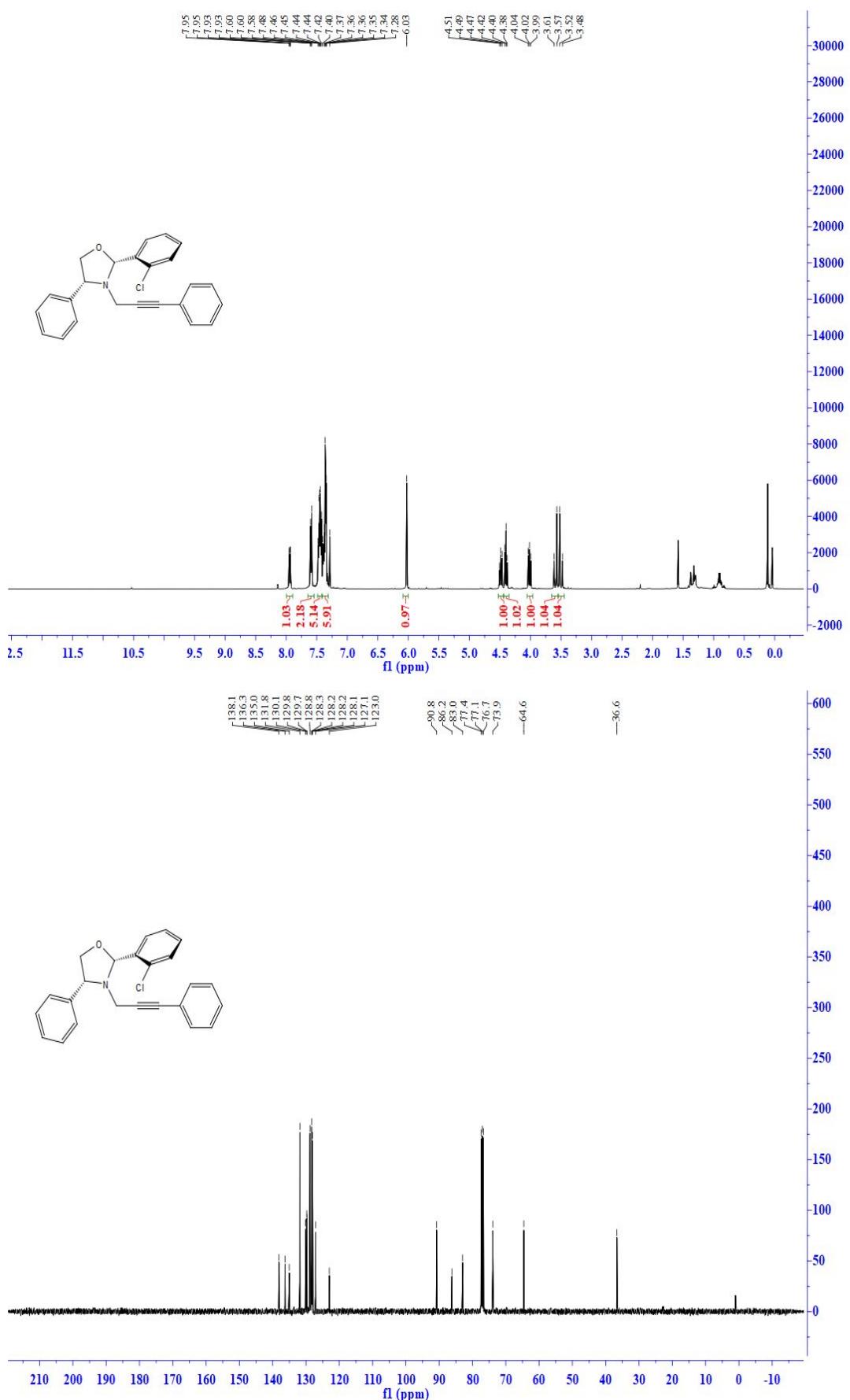
**(2*R*,4*R*)-2-(furan-2-yl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zi)**



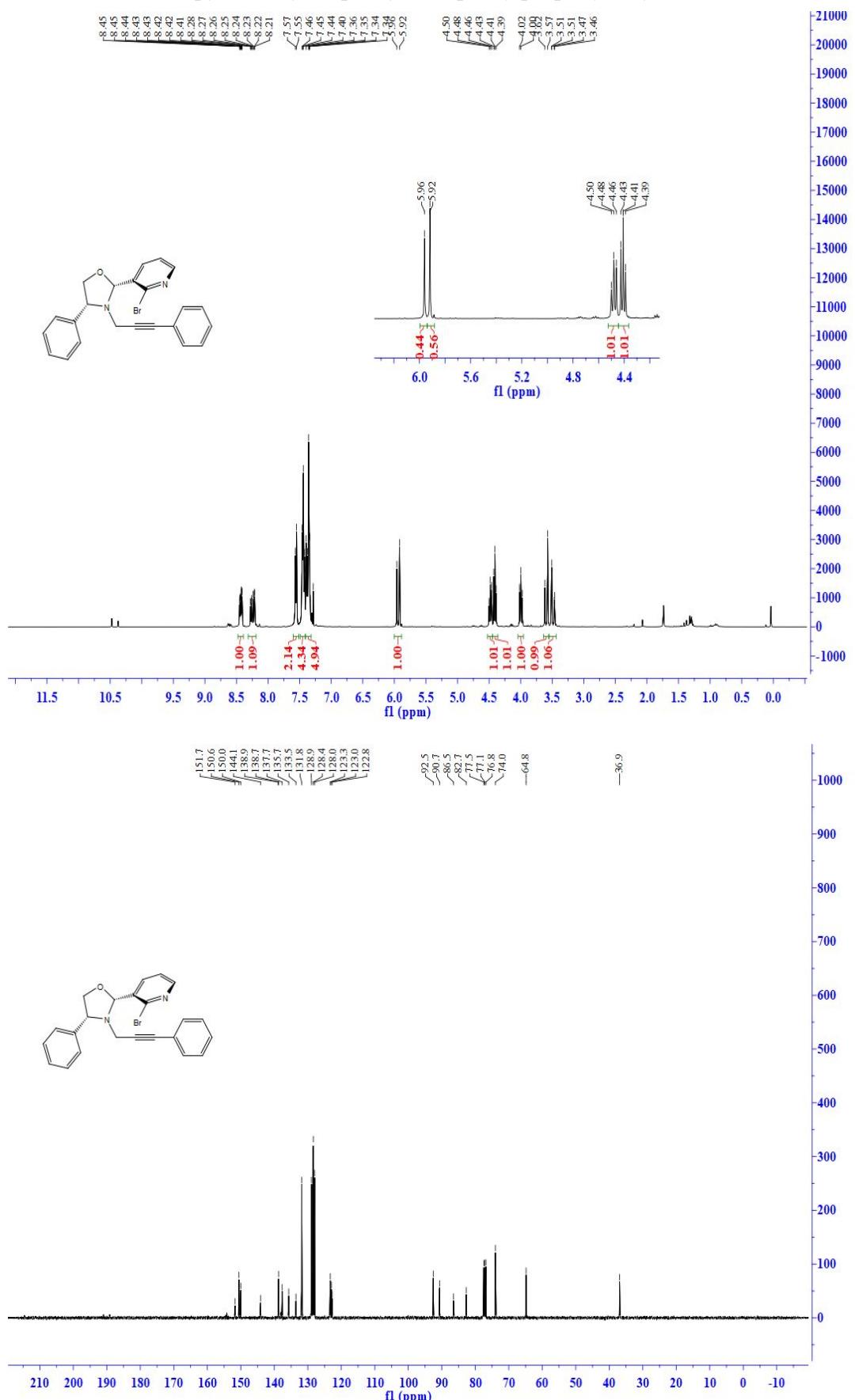
**(2*R*,4*R*)-2-isopropyl-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5j)**



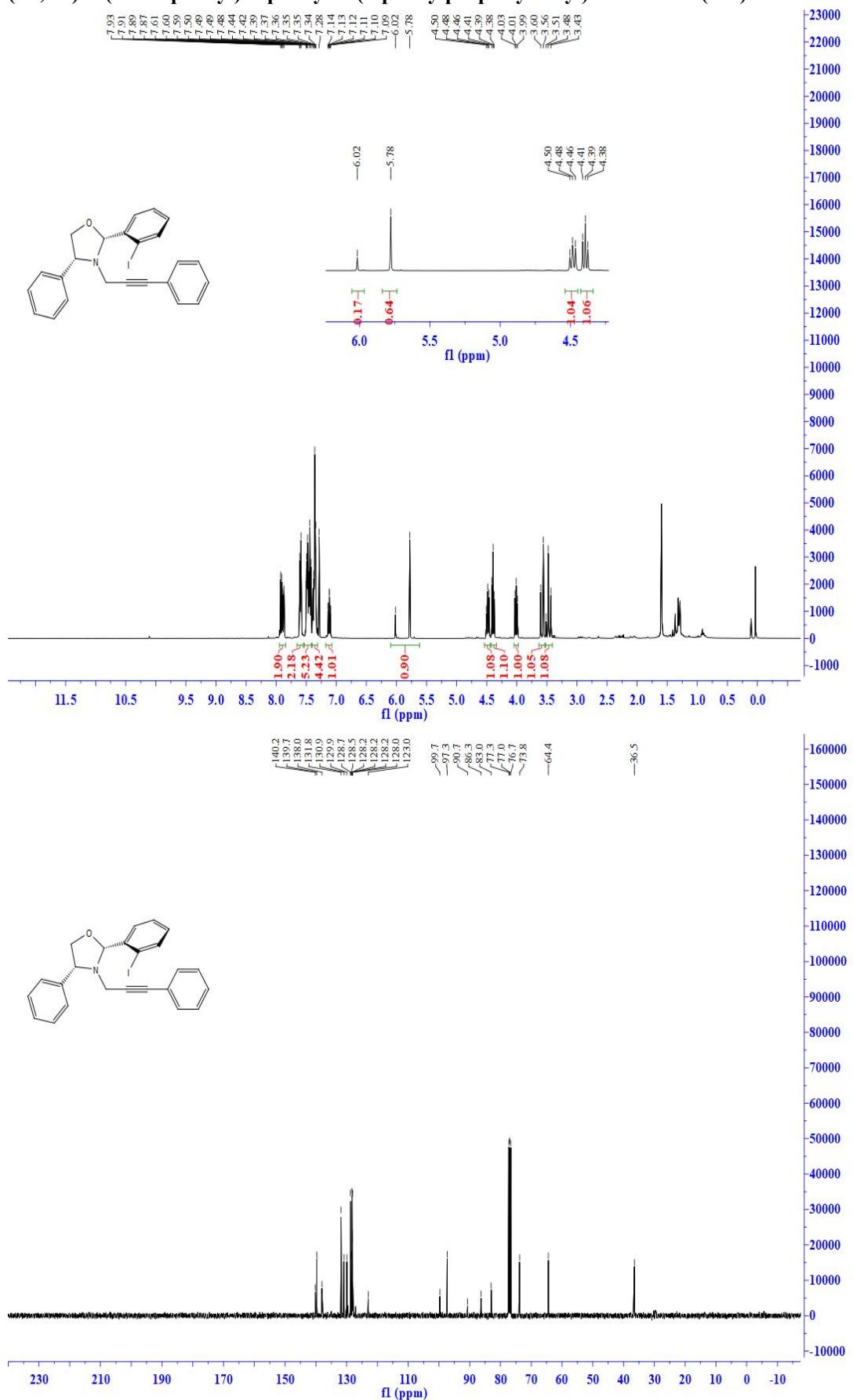
**(2*R*,4*R*)-2-(2-chlorophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zm)**



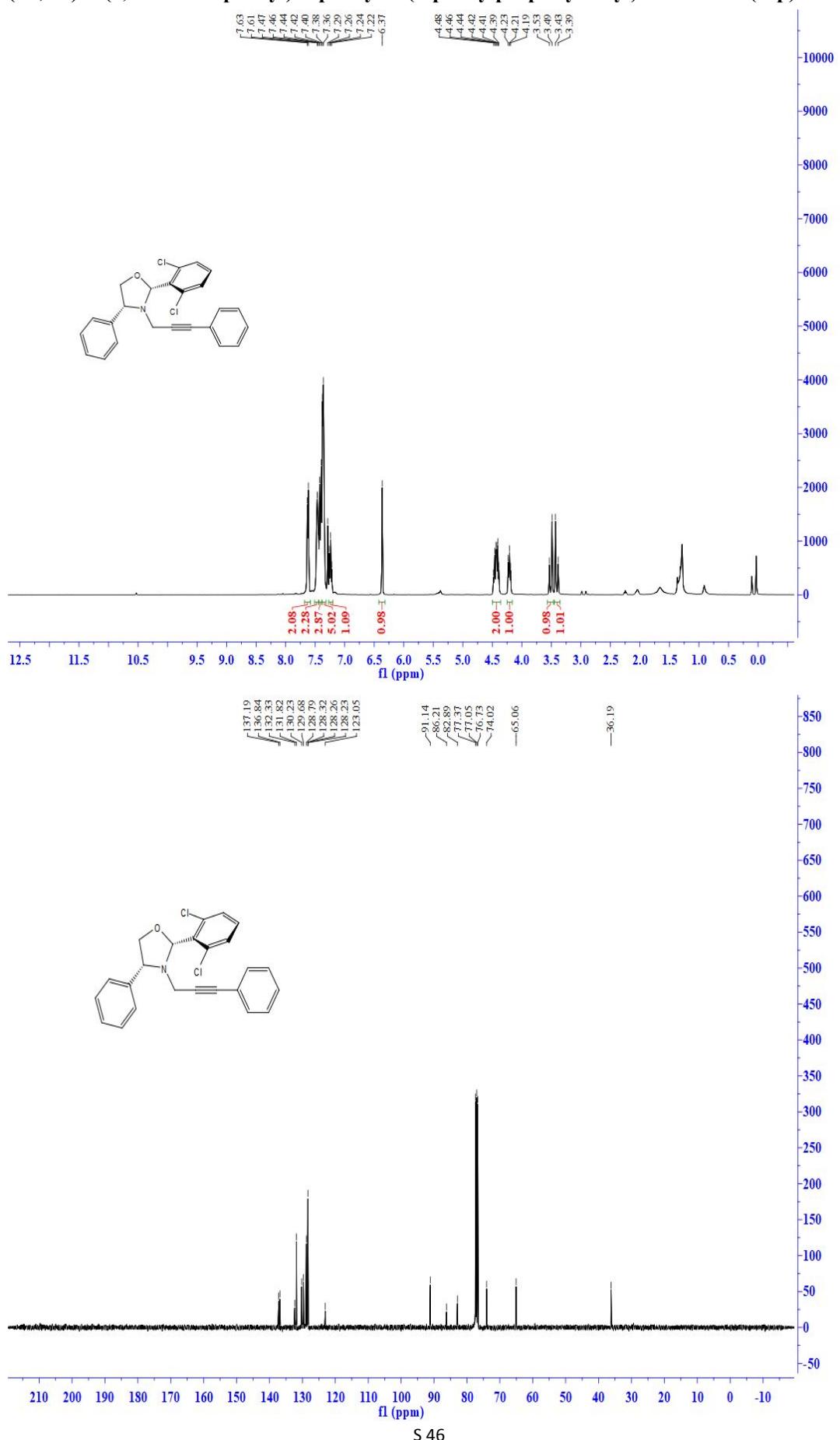
**(2*R*,4*R*)-2-(2-bromopyridin-3-yl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zn)**



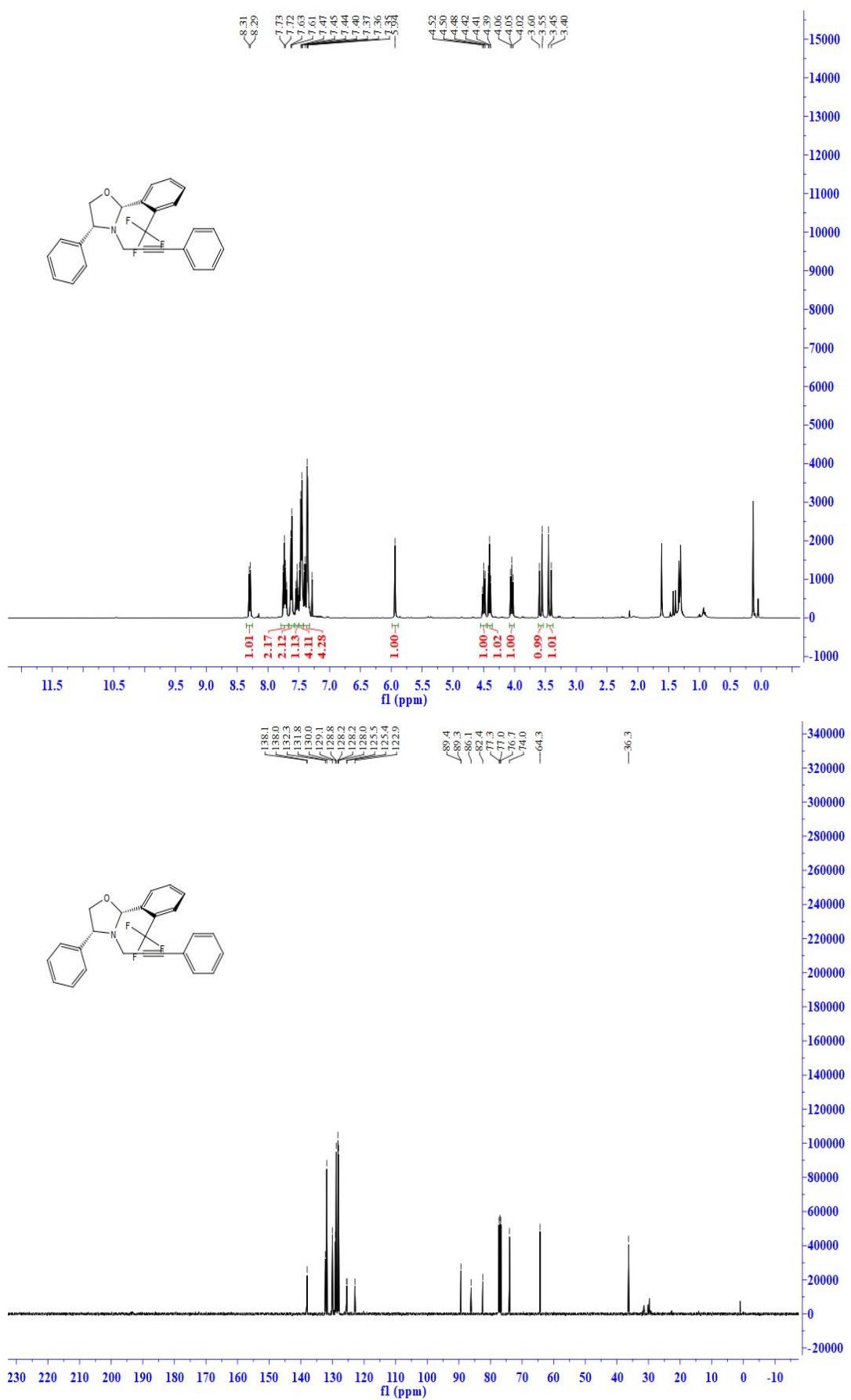
**(2*R*,4*R*)-2-(2-iodophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zo)**



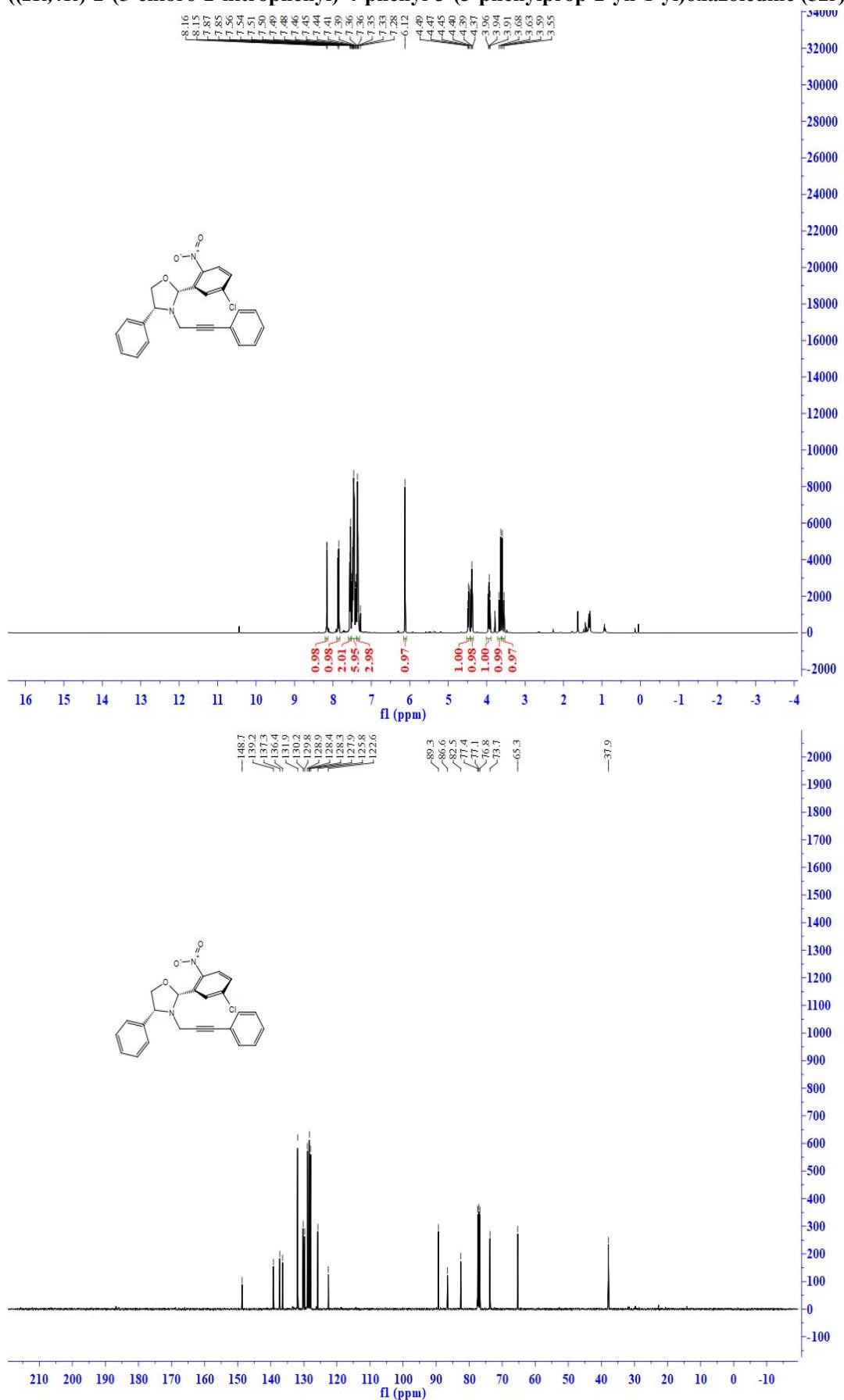
(2*R*,4*R*)-2-(2,6-dichlorophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazolidine (5zp)



**(2*R*,4*R*)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)-2-(trifluoromethyl)phenyl)oxazolidine (5zq)**



**((2*R*,4*R*)-2-(5-chloro-2-nitrophenyl)-4-phenyl-3-(3-phenylprop-2-yn-1-yl)oxazoledine (5zr)**



**(R)-2-(benzyl(3-phenylprop-2-yn-1-yl)amino)-2-phenylethan-1-ol (5zt)**

