

*Supplementary Information*

## **(2*S<sub>p</sub>*,4*R*,6*R*,8*S<sub>p</sub>*)-4,6-Dimethyl-1-phenyl-diferroceno-1-phosphines**

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## 1. Diamine phosphineoxide 2a

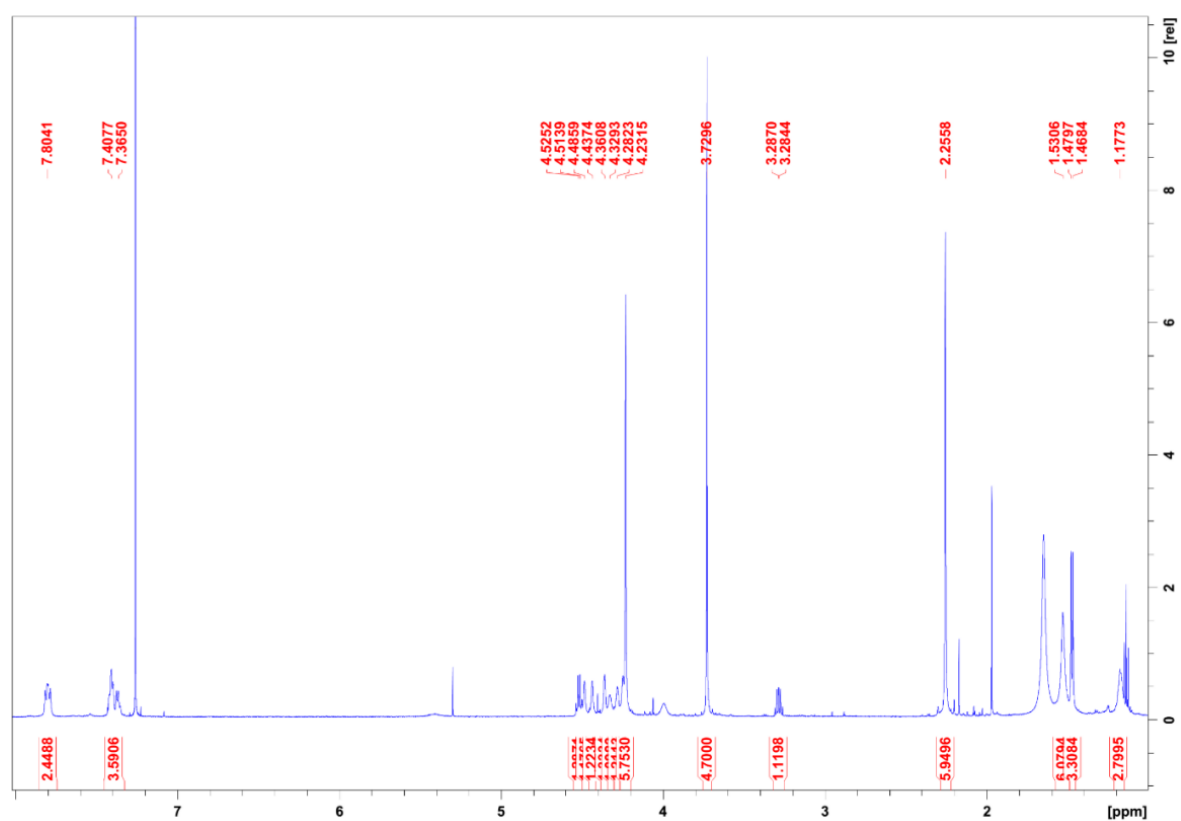


Figure S1

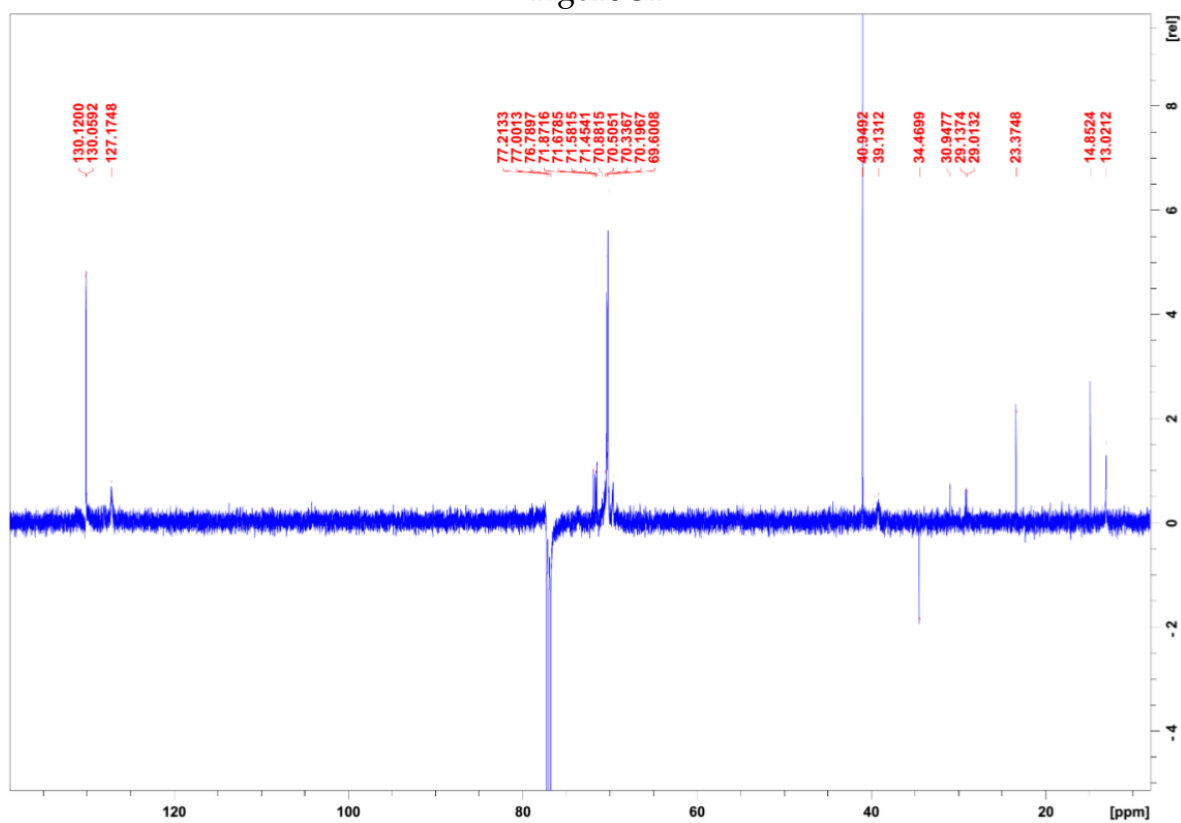


Figure S2

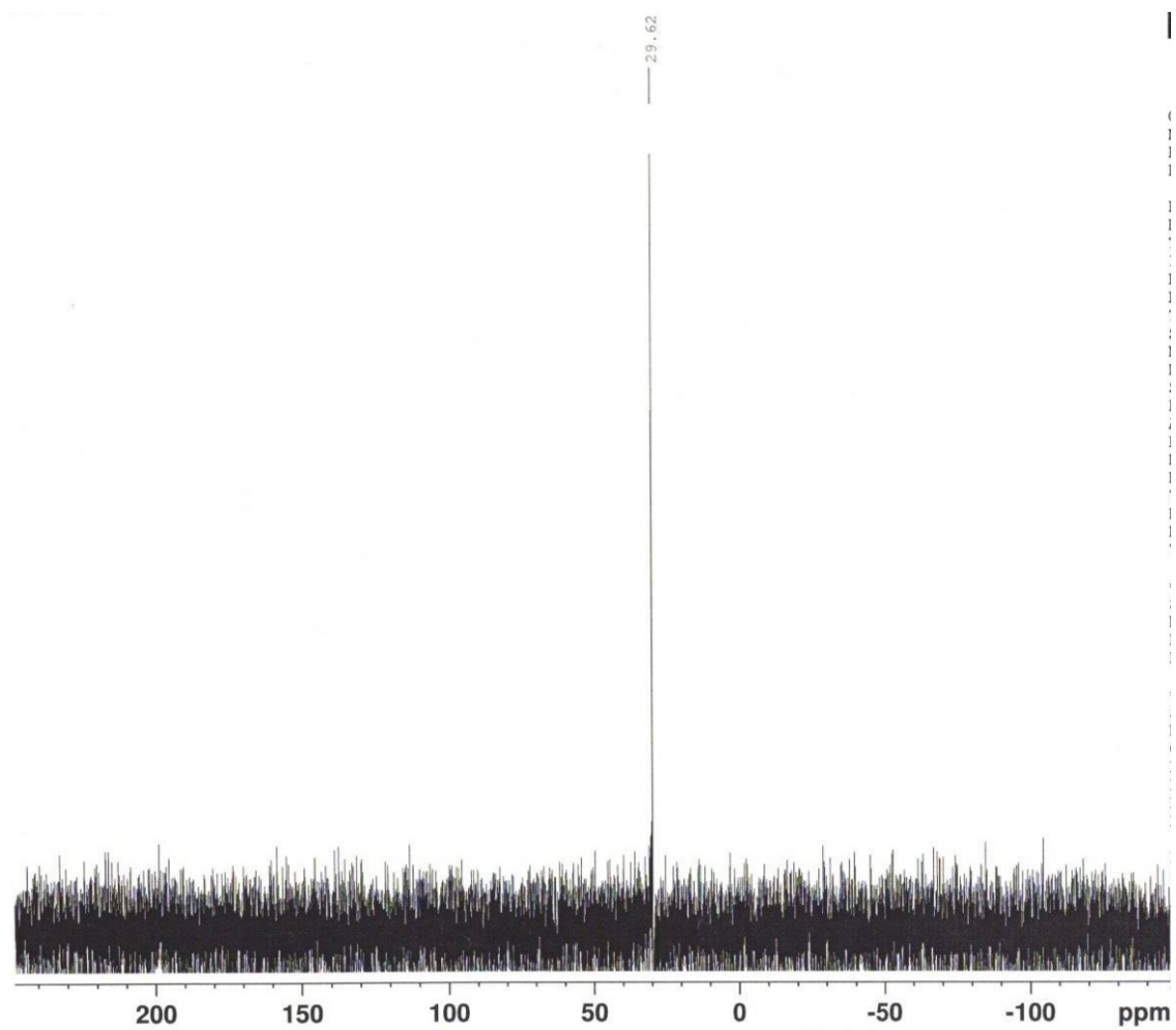


Figure S3

## 2. Phosphineoxide ether 4a

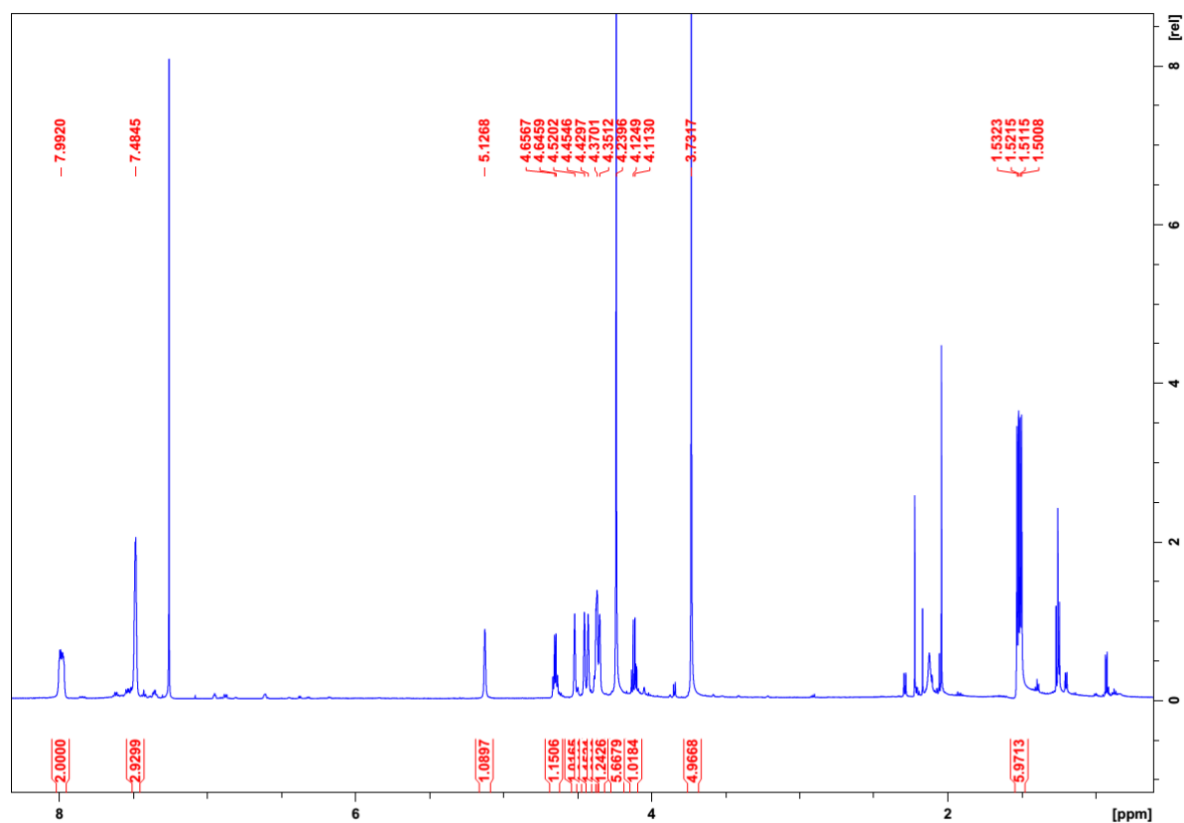


Figure S4

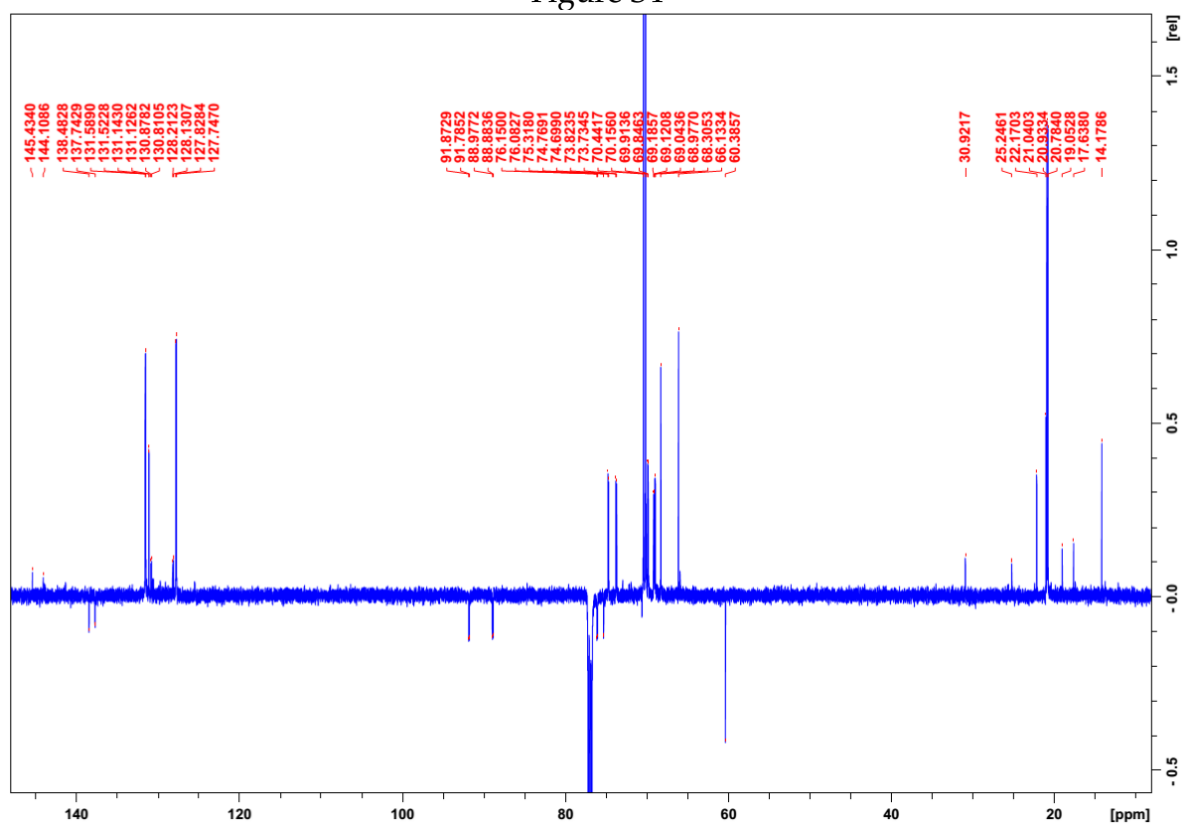


Figure S5

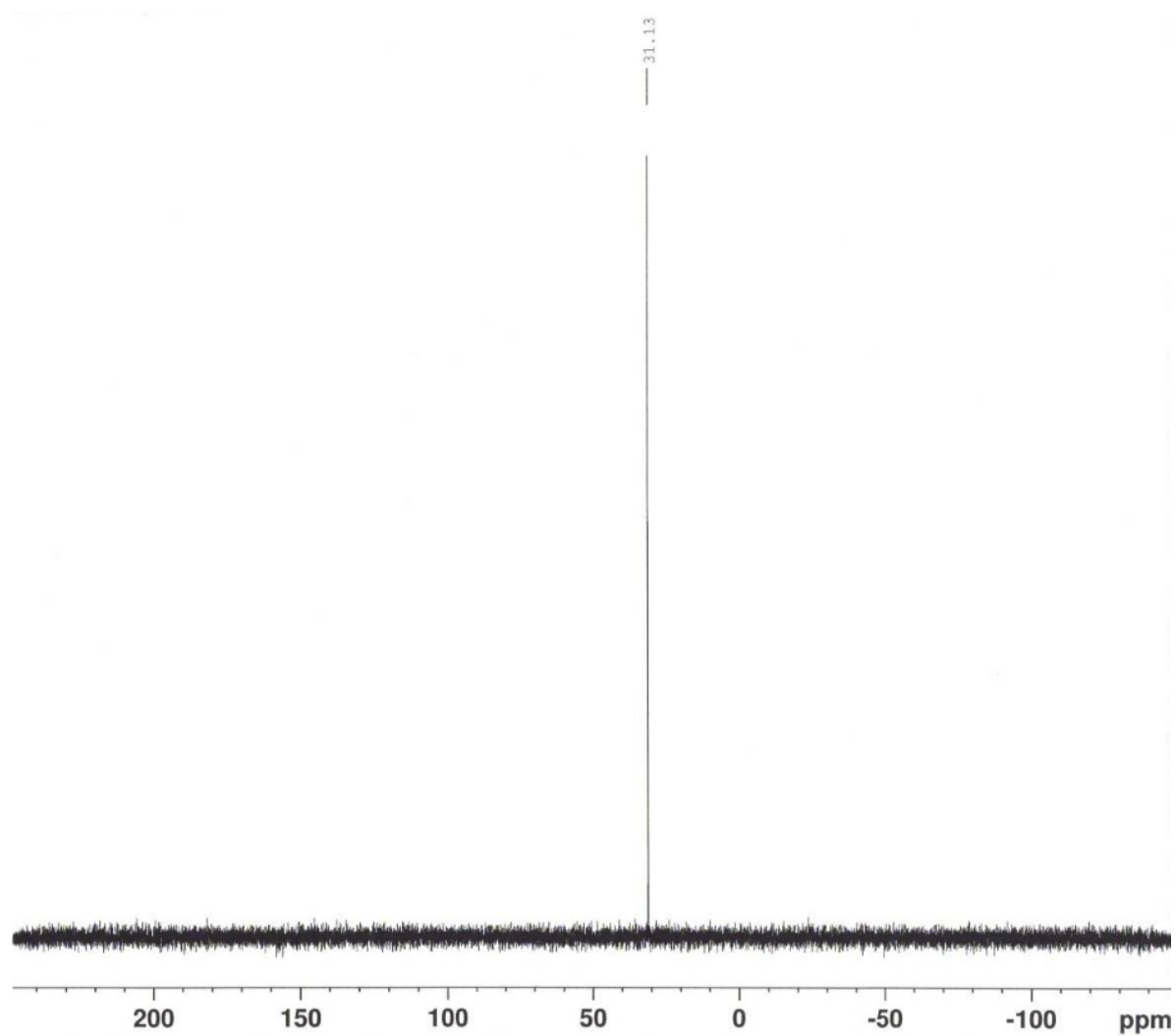


Figure S6

### 3. Phosphinesulfide ether 4b

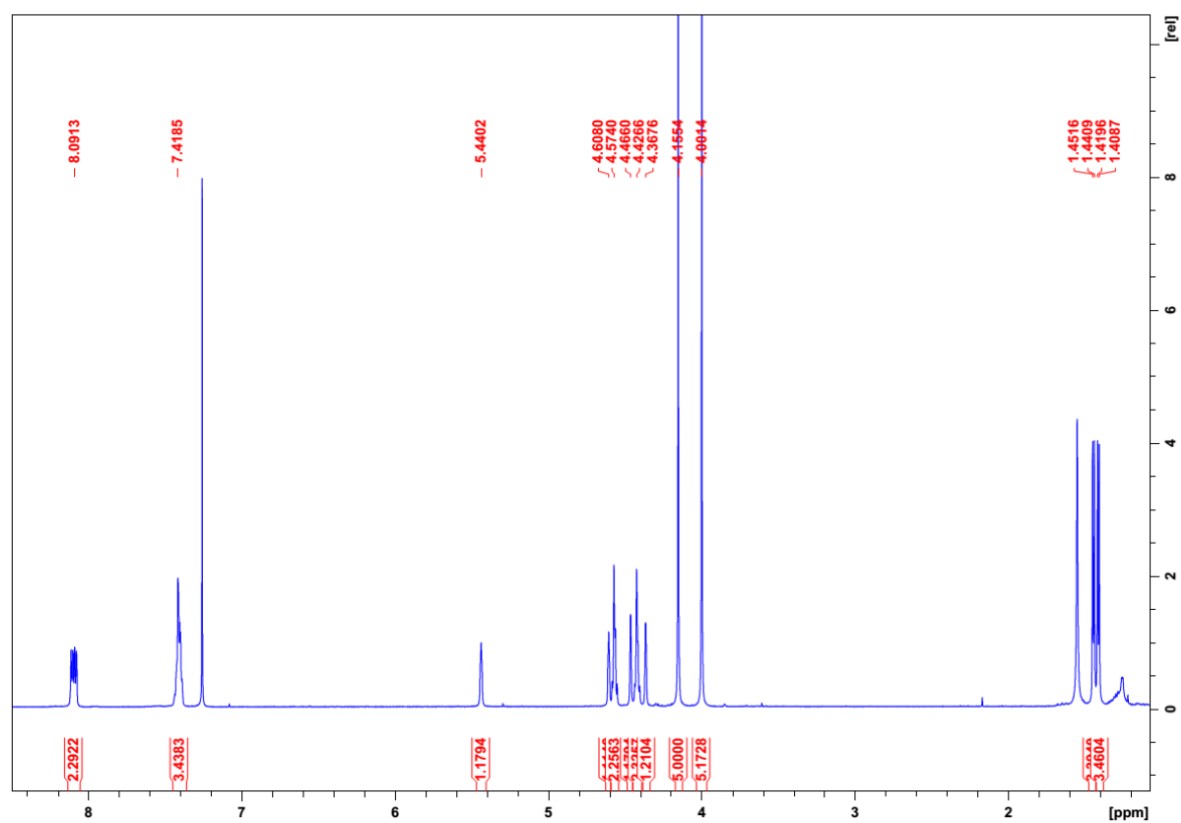


Figure S7

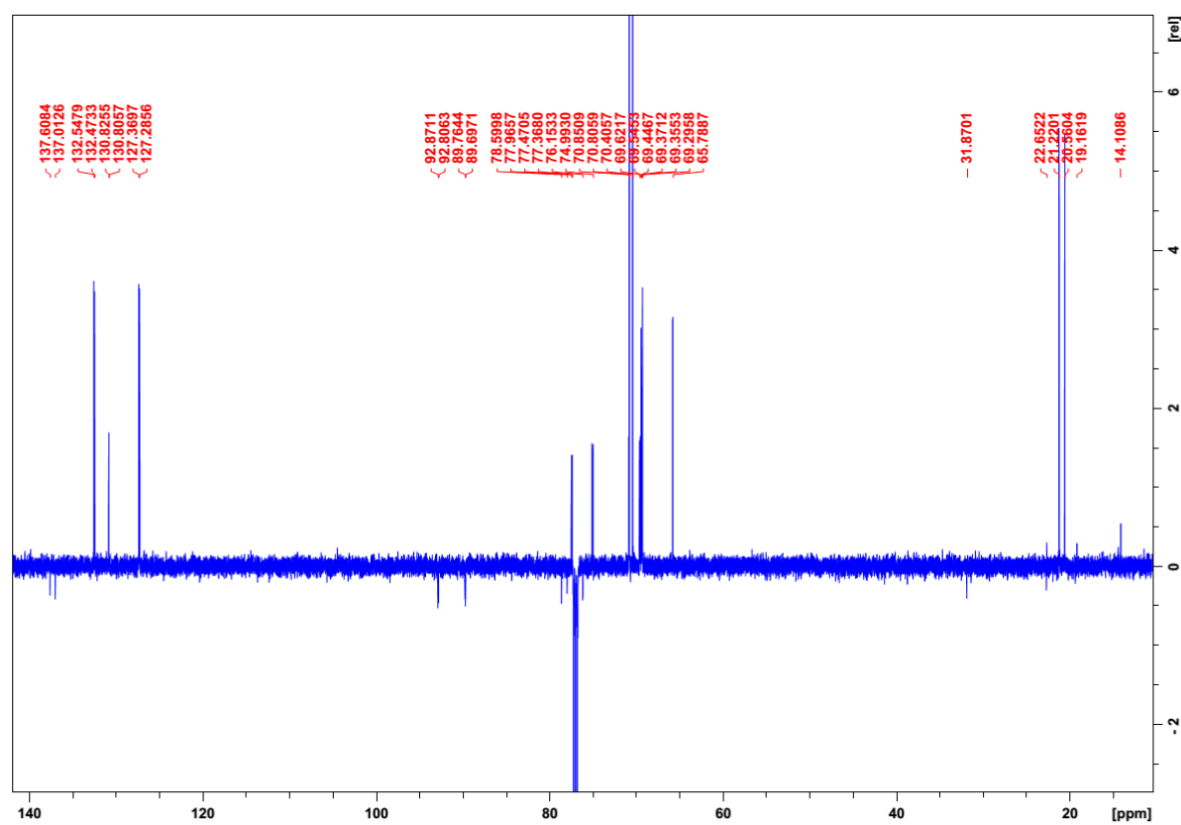


Figure S8

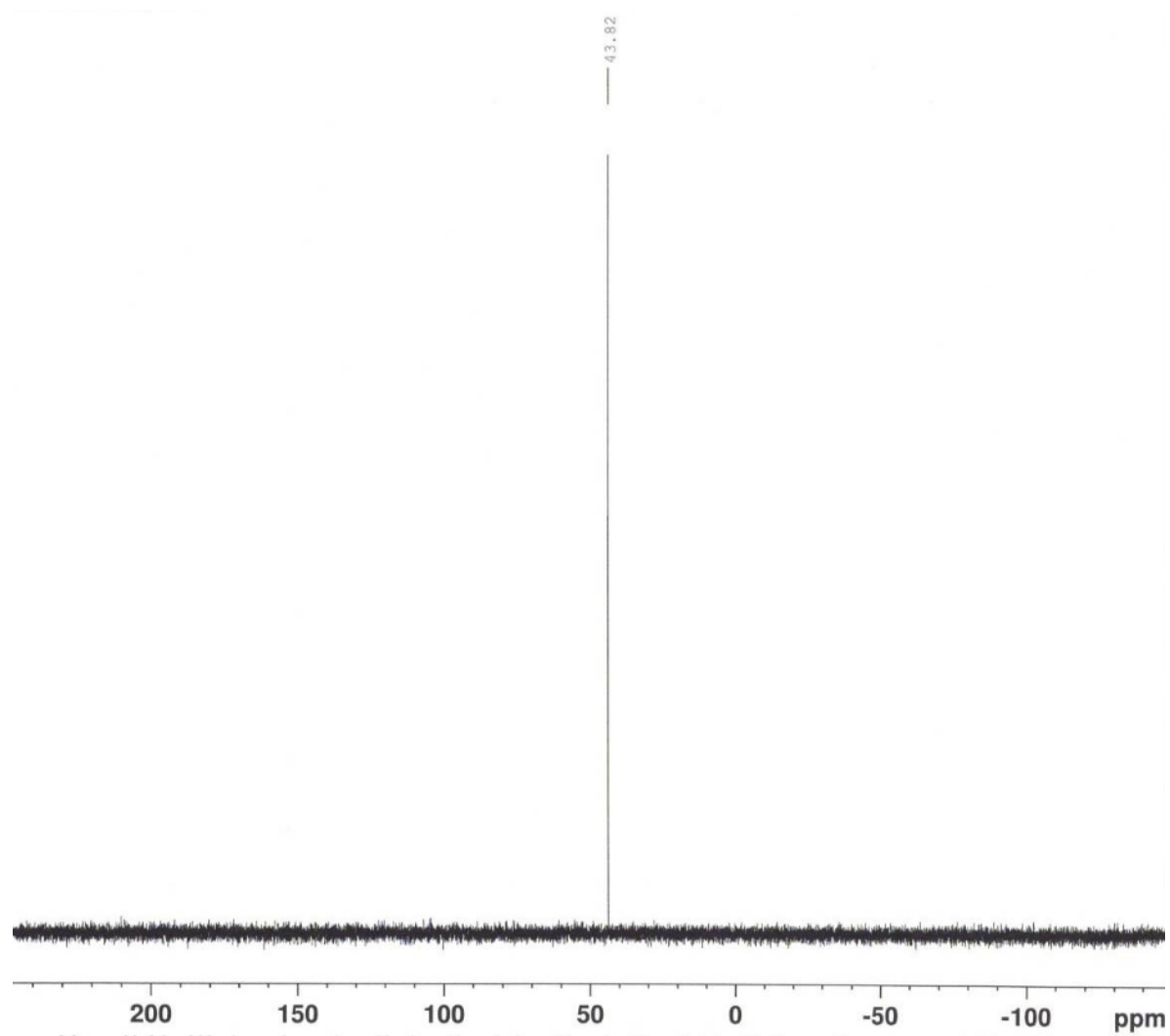


Figure S9

## 4. Phosphineoxide thioether 7a

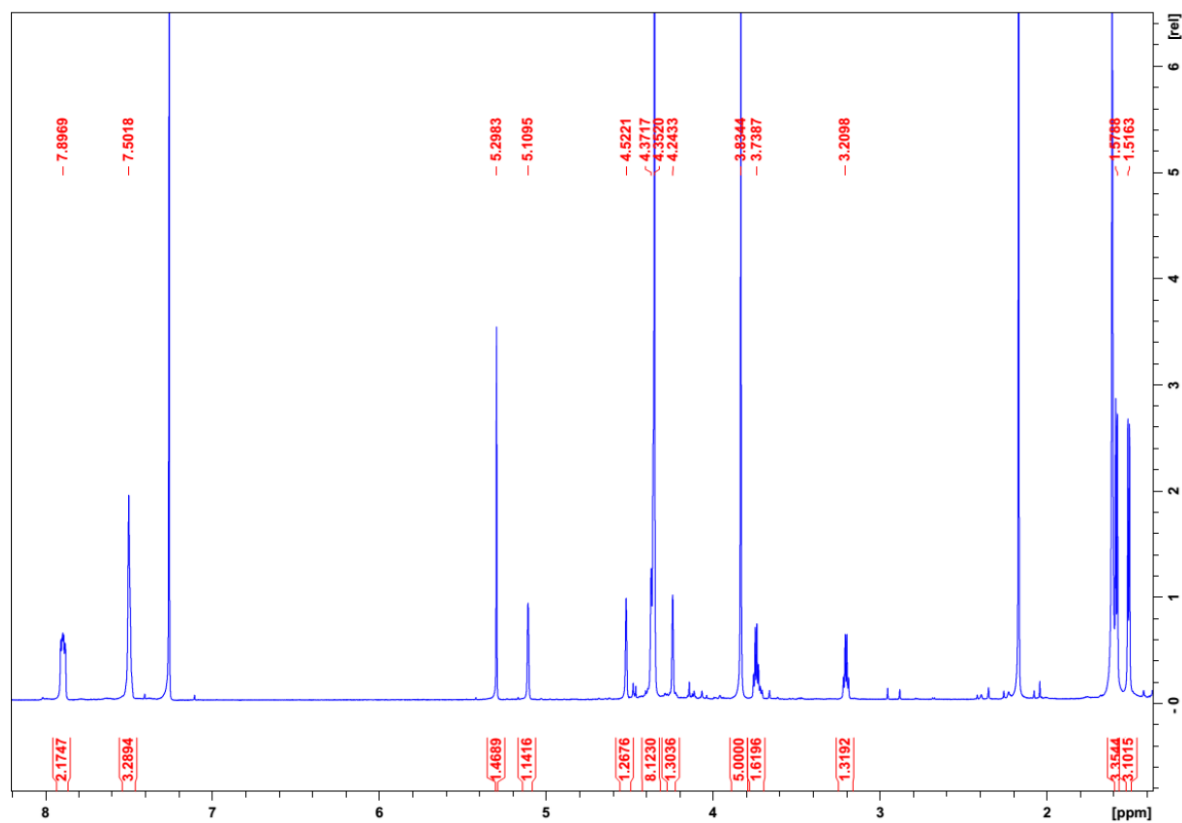


Figure S10

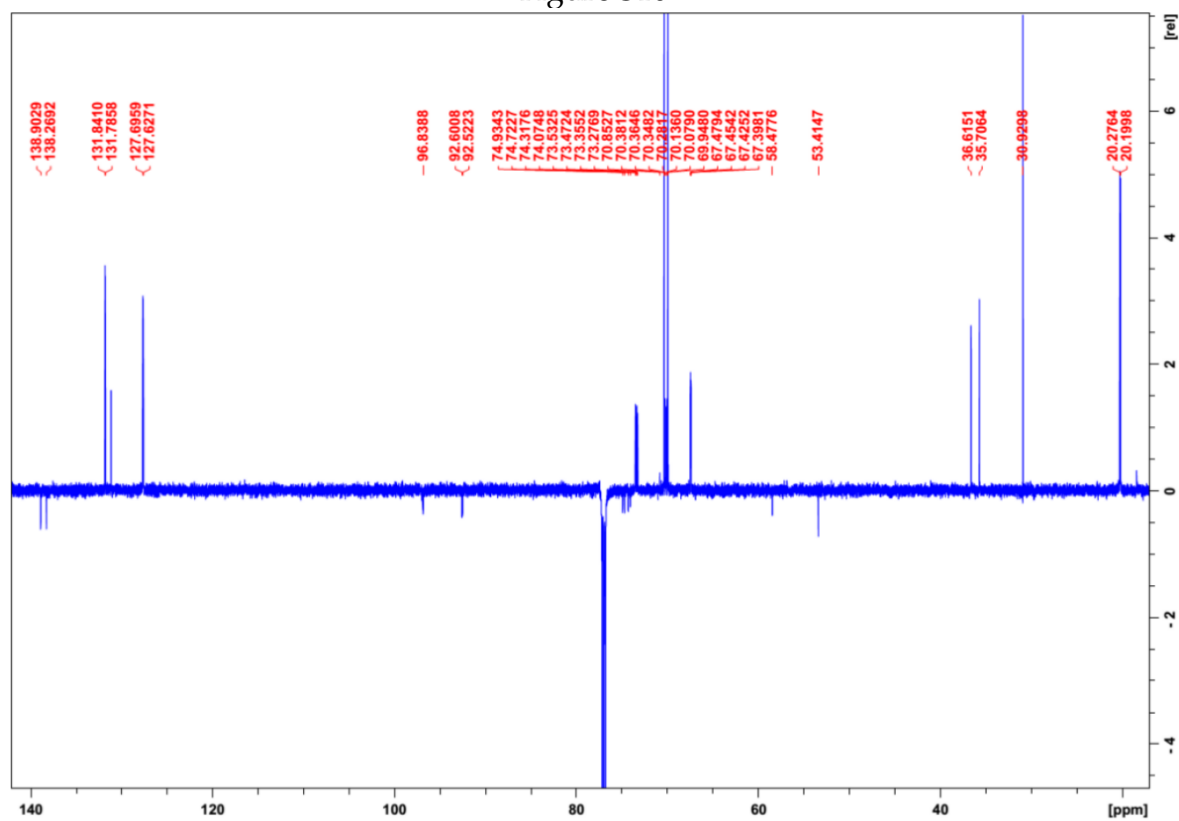


Figure S11

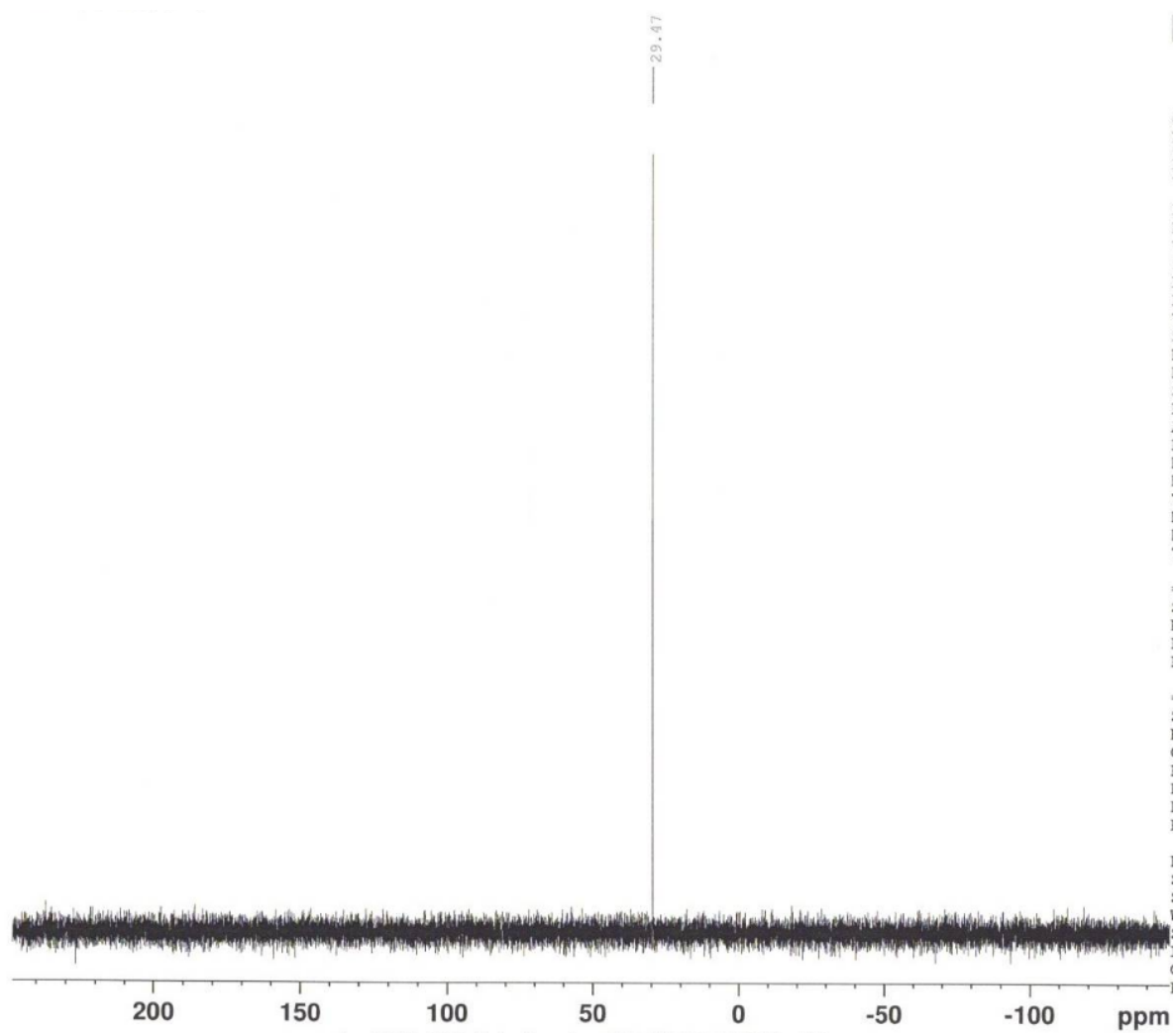


Figure S12

## 5. Phosphinesulfide thioether 7b

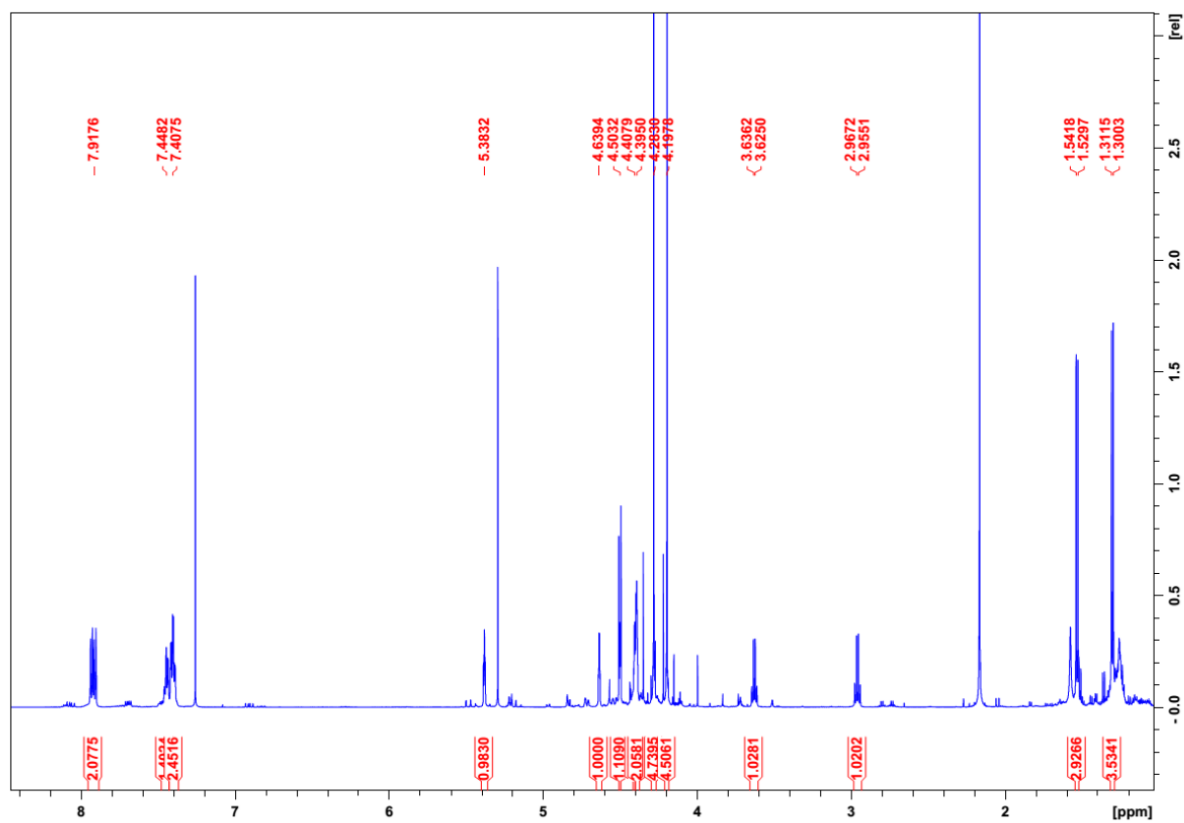


Figure S13

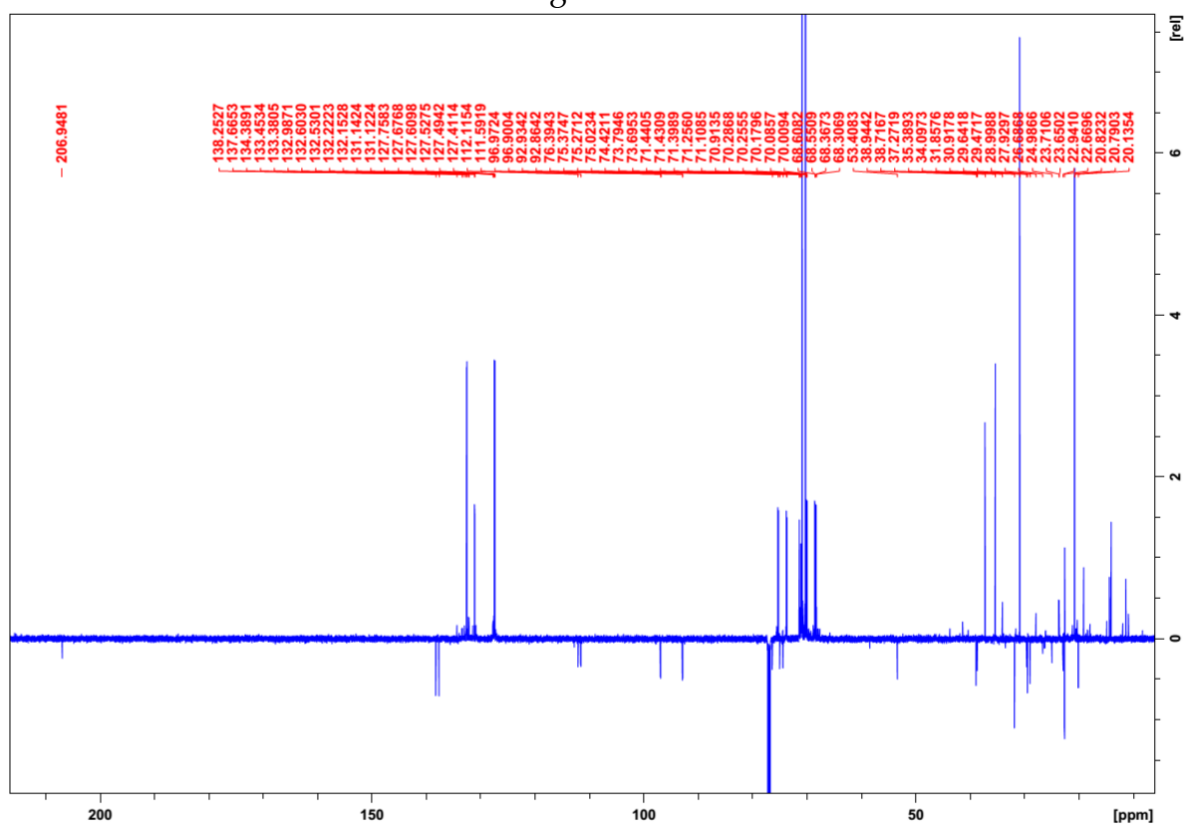


Figure S14

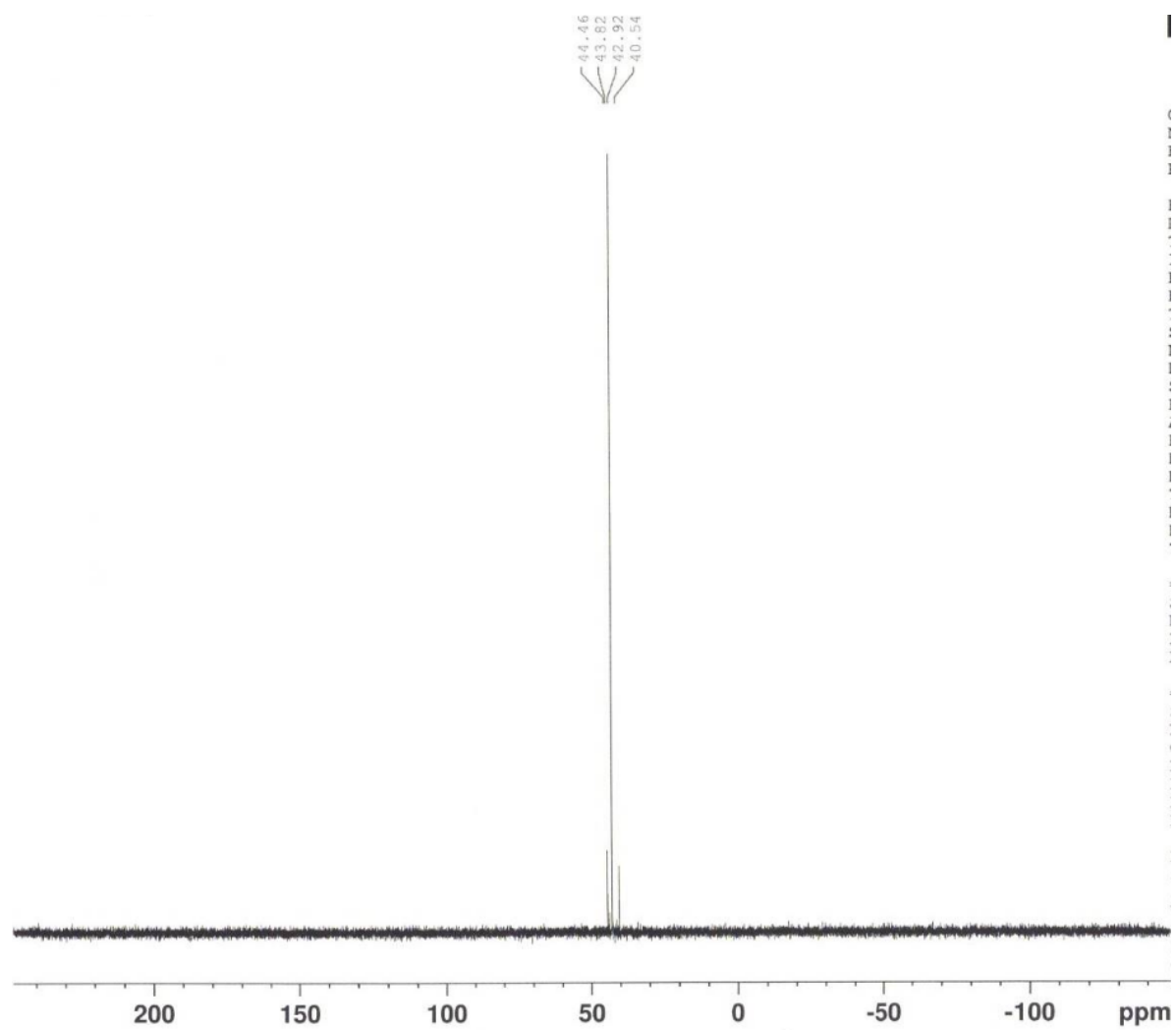


Figure S15

## 6. Phosphineoxide N-benzyl 8a

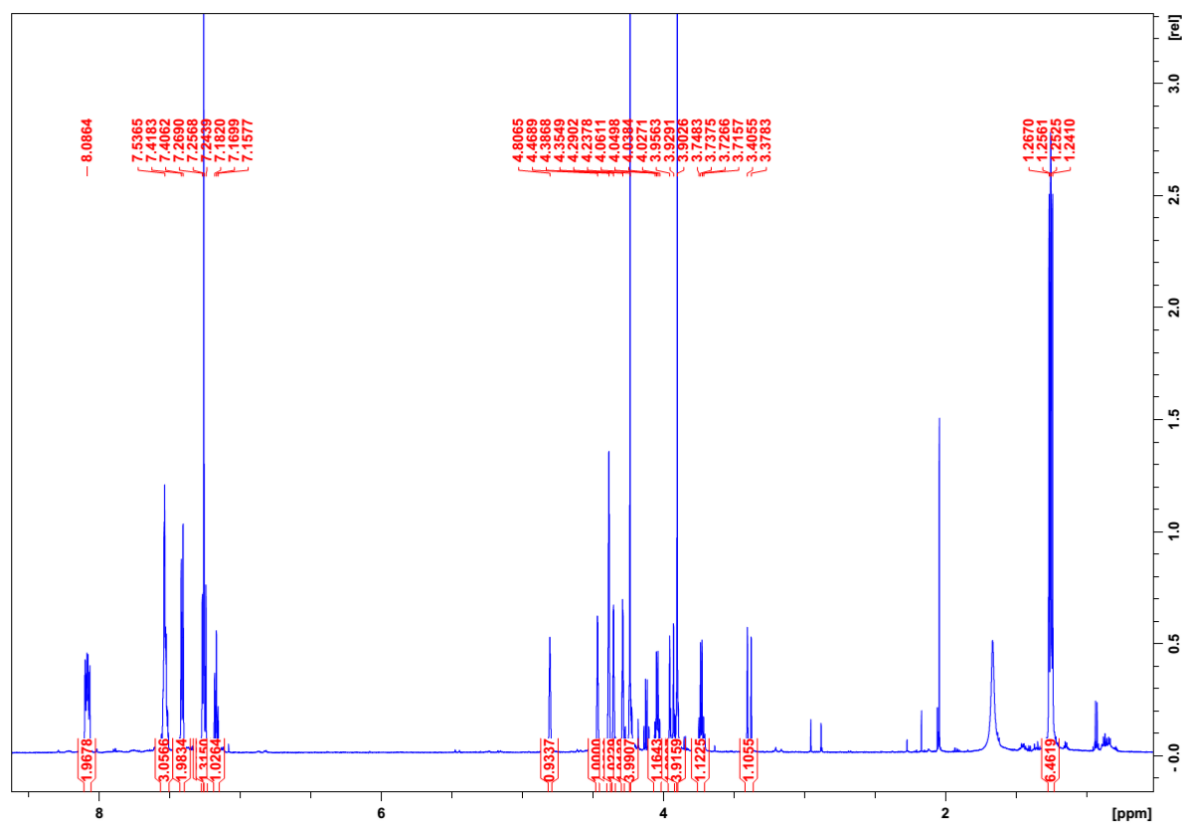


Figure S16

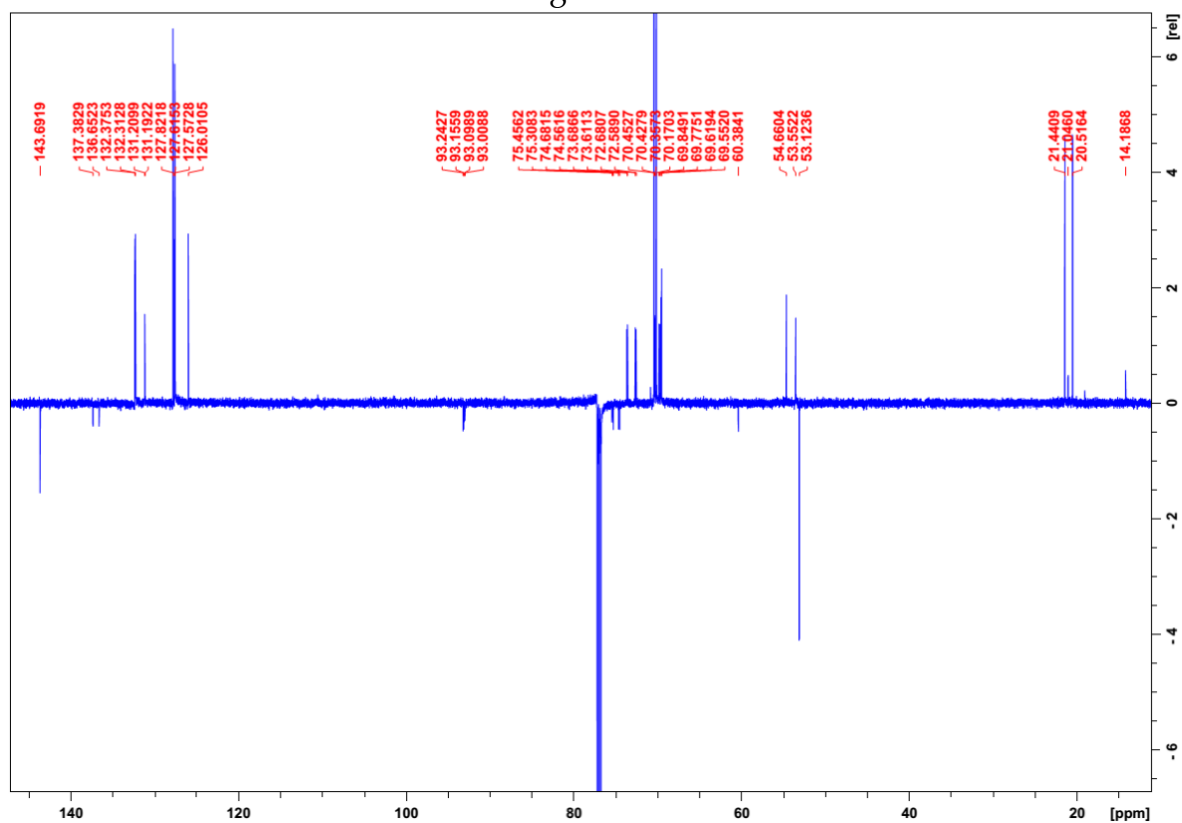


Figure S17

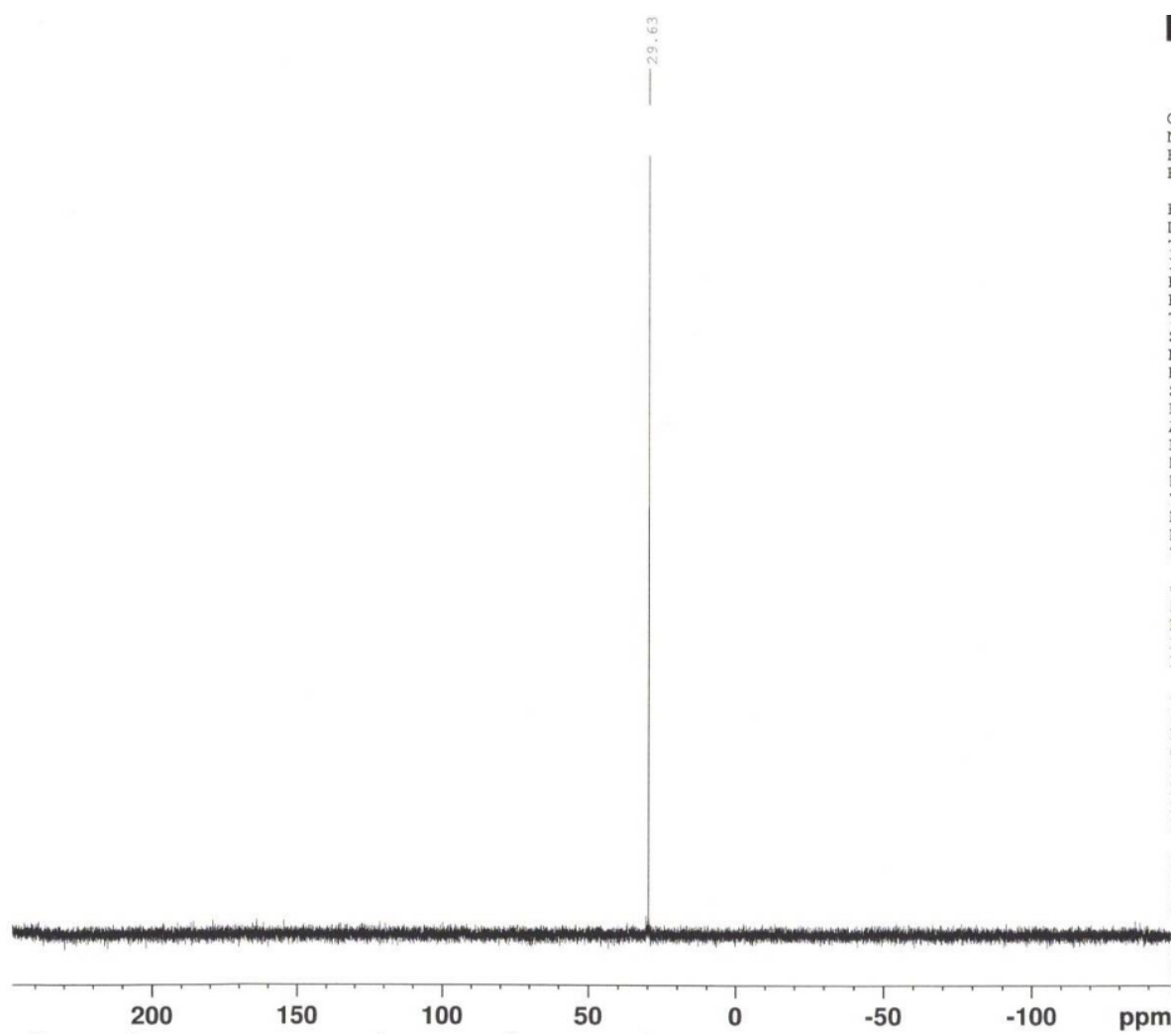


Figure S18

## 7. Phosphinesulfide N-benzyl 8b

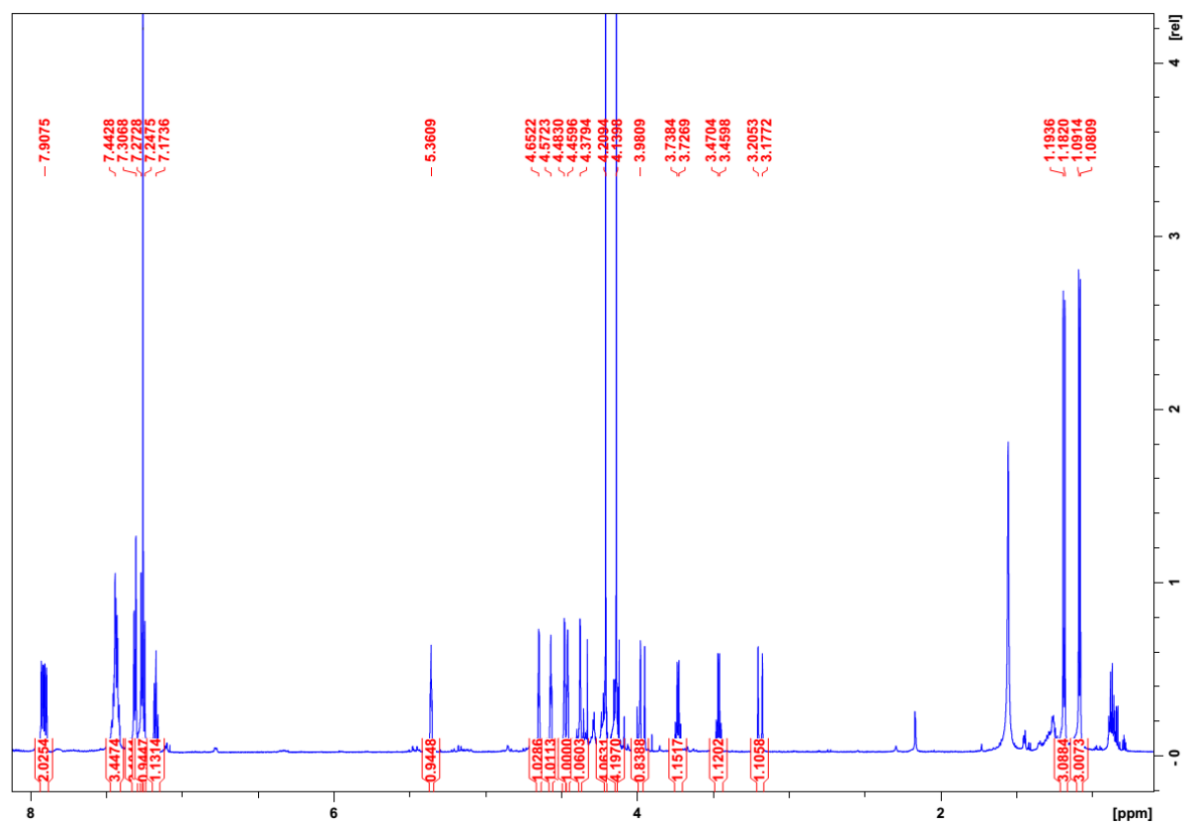


Figure S19

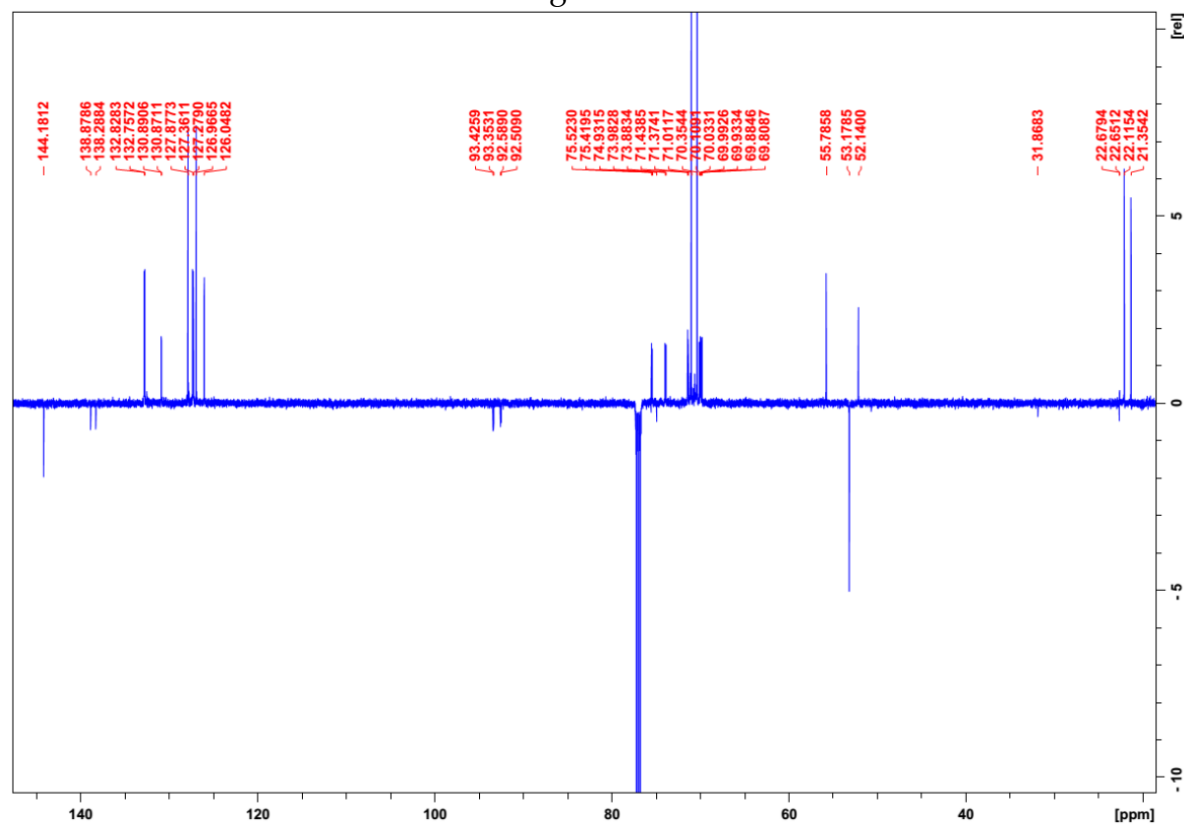


Figure S20

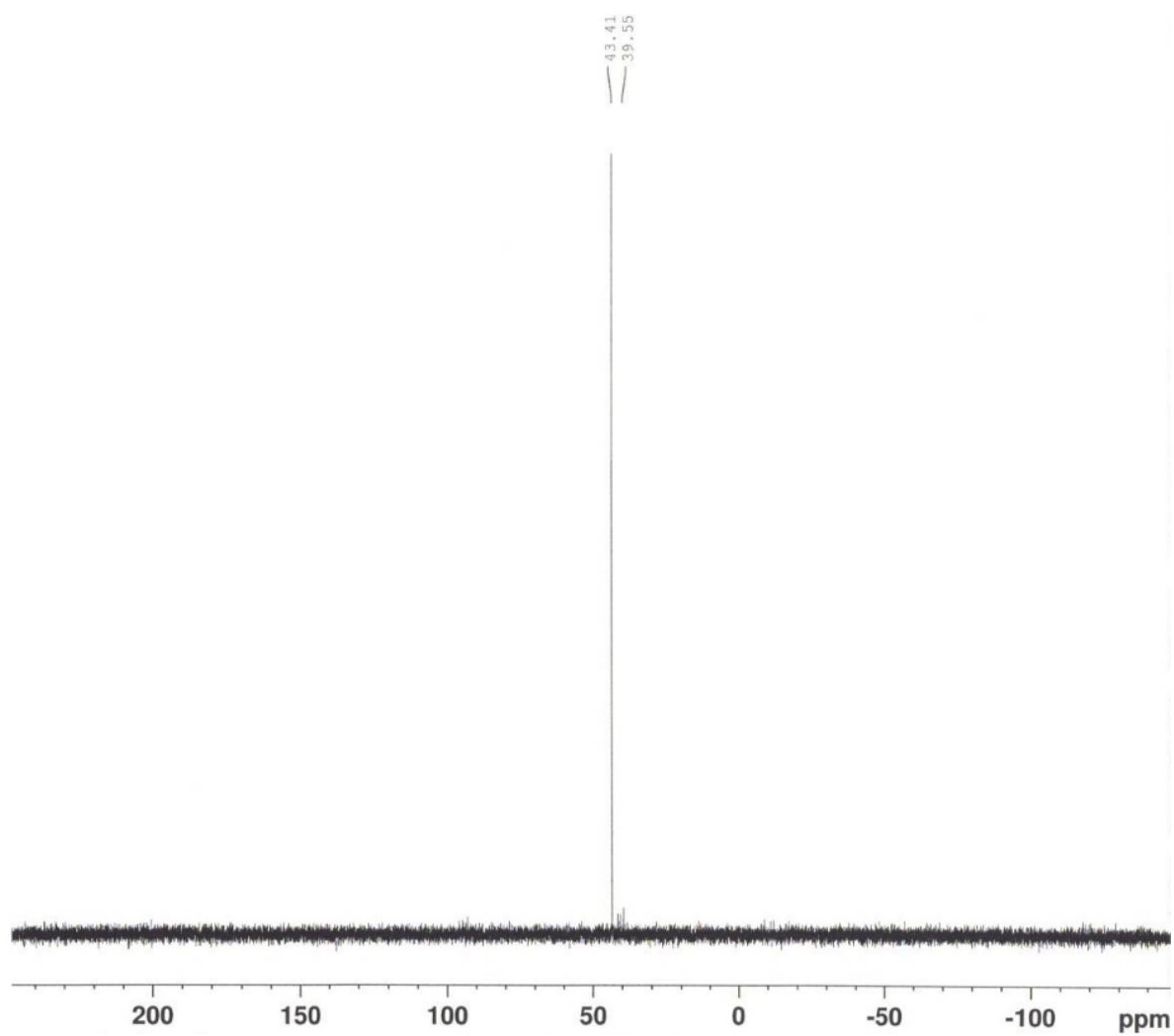


Figure S21

## 8. Side product 5

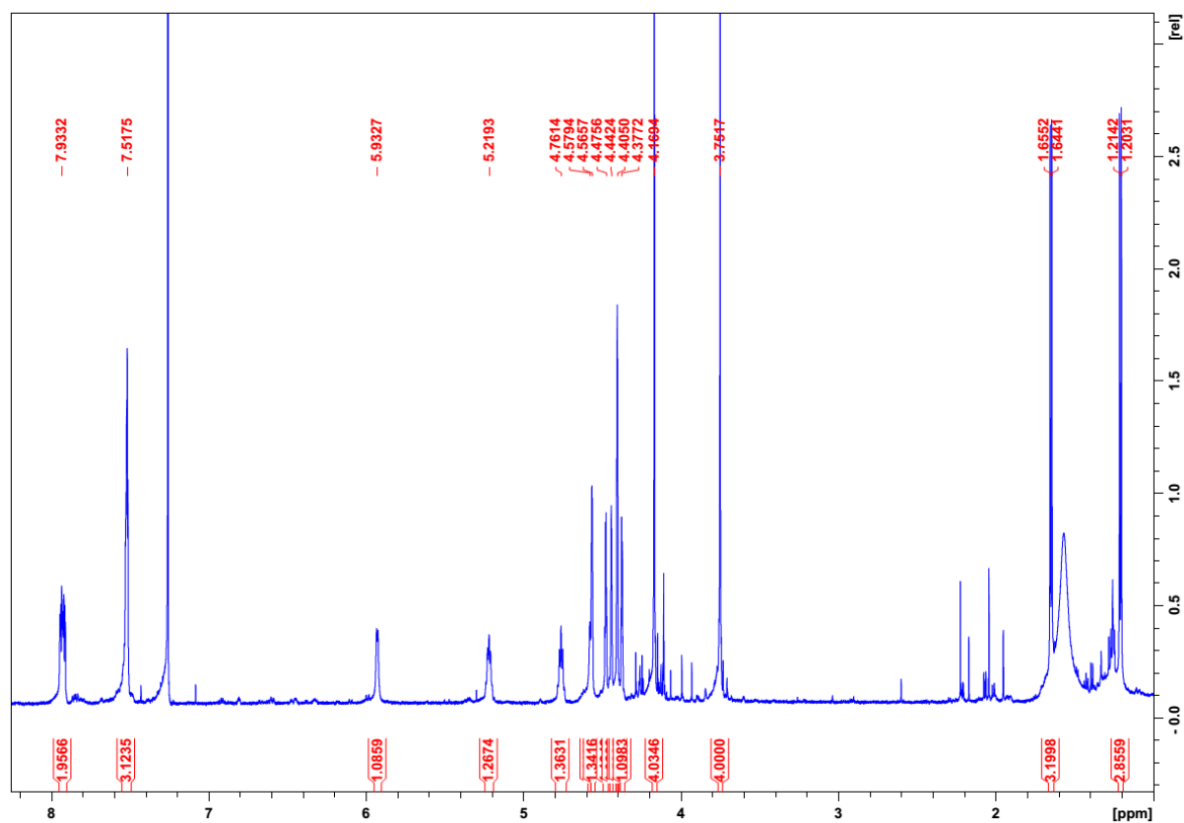


Figure S22

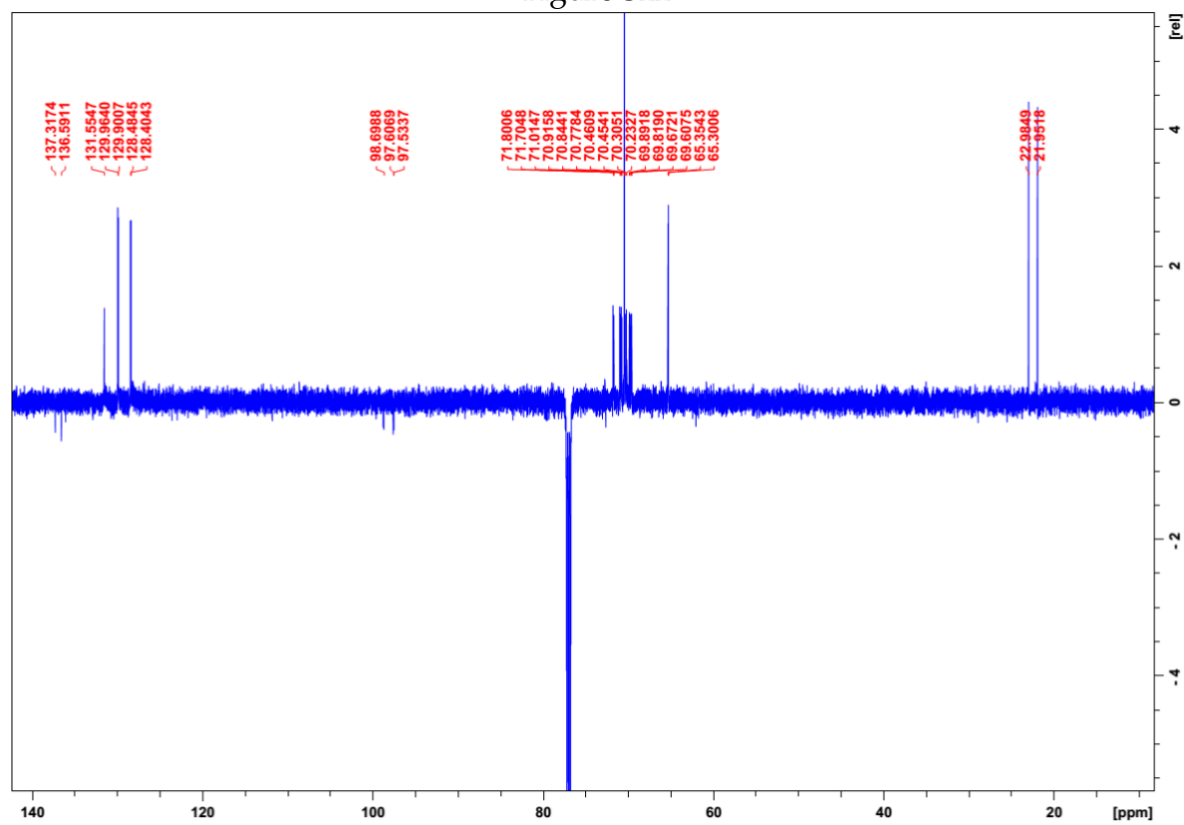


Figure S23

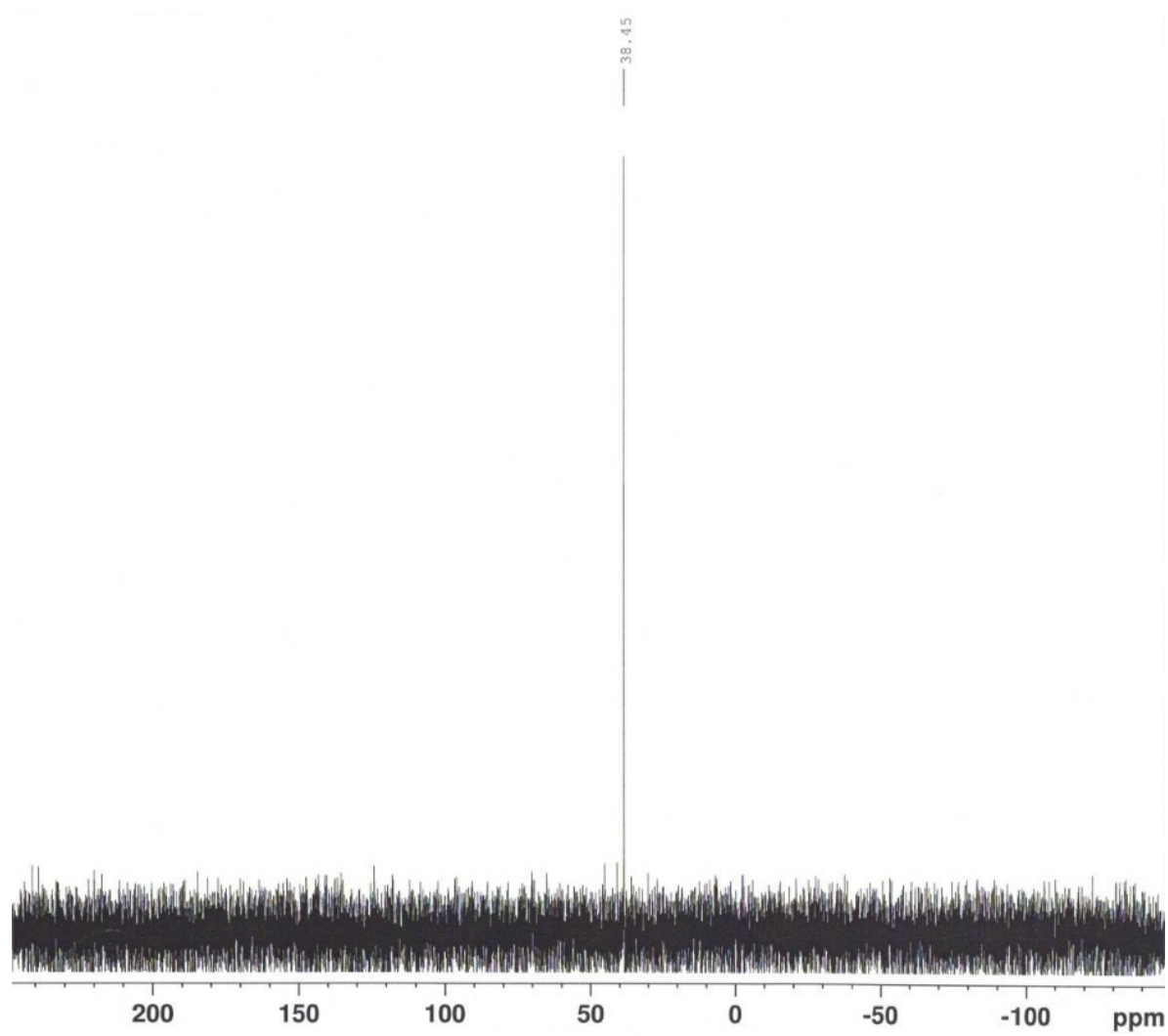


Figure S24

## 9. Side product 6

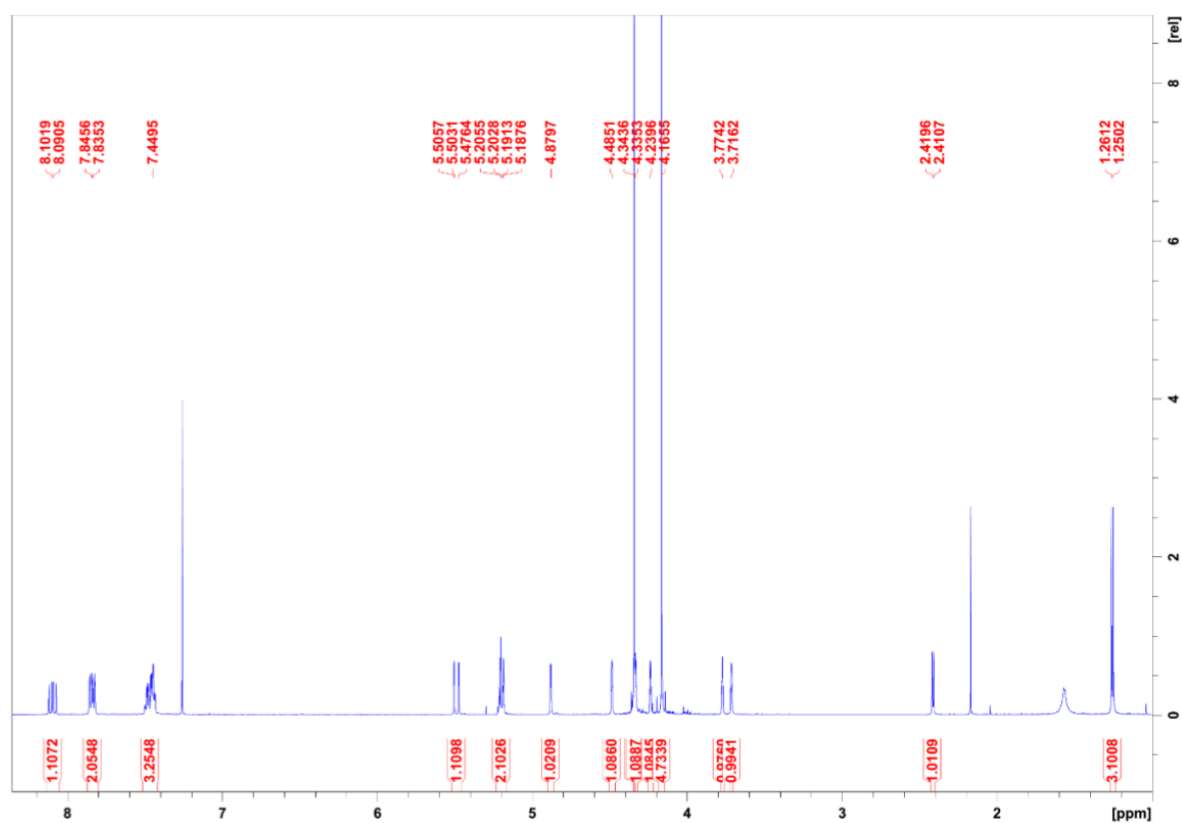


Figure S25

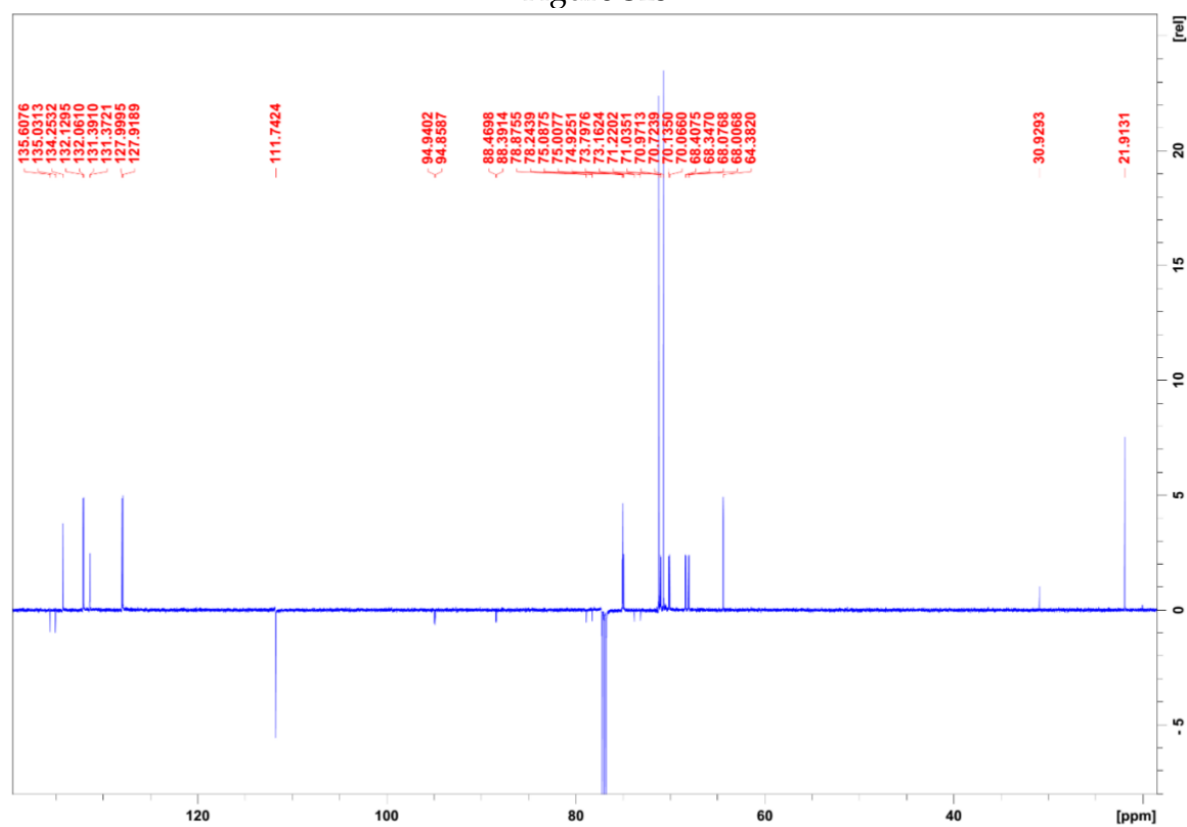


Figure S26

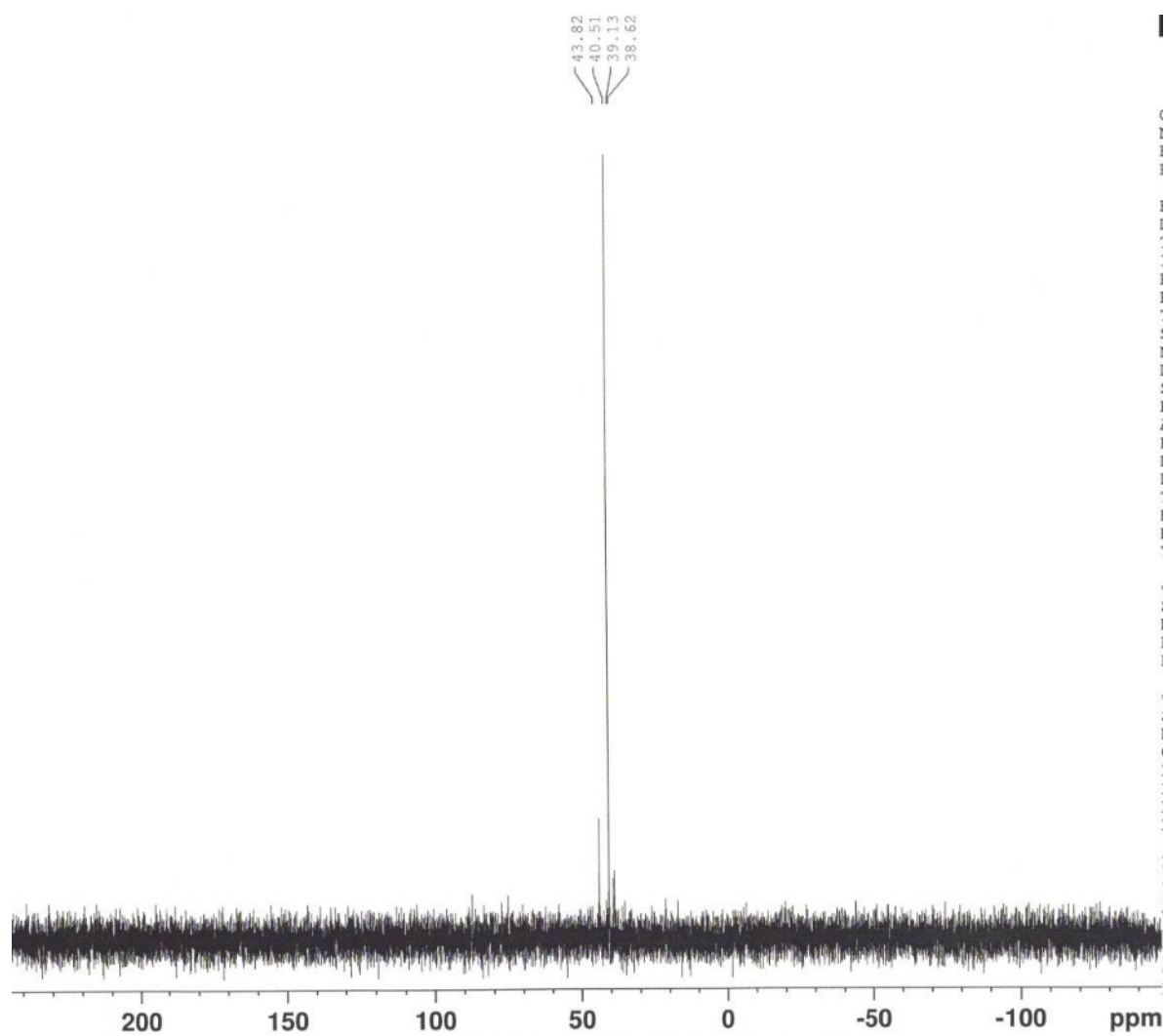


Figure S27

## 10. Side product 9

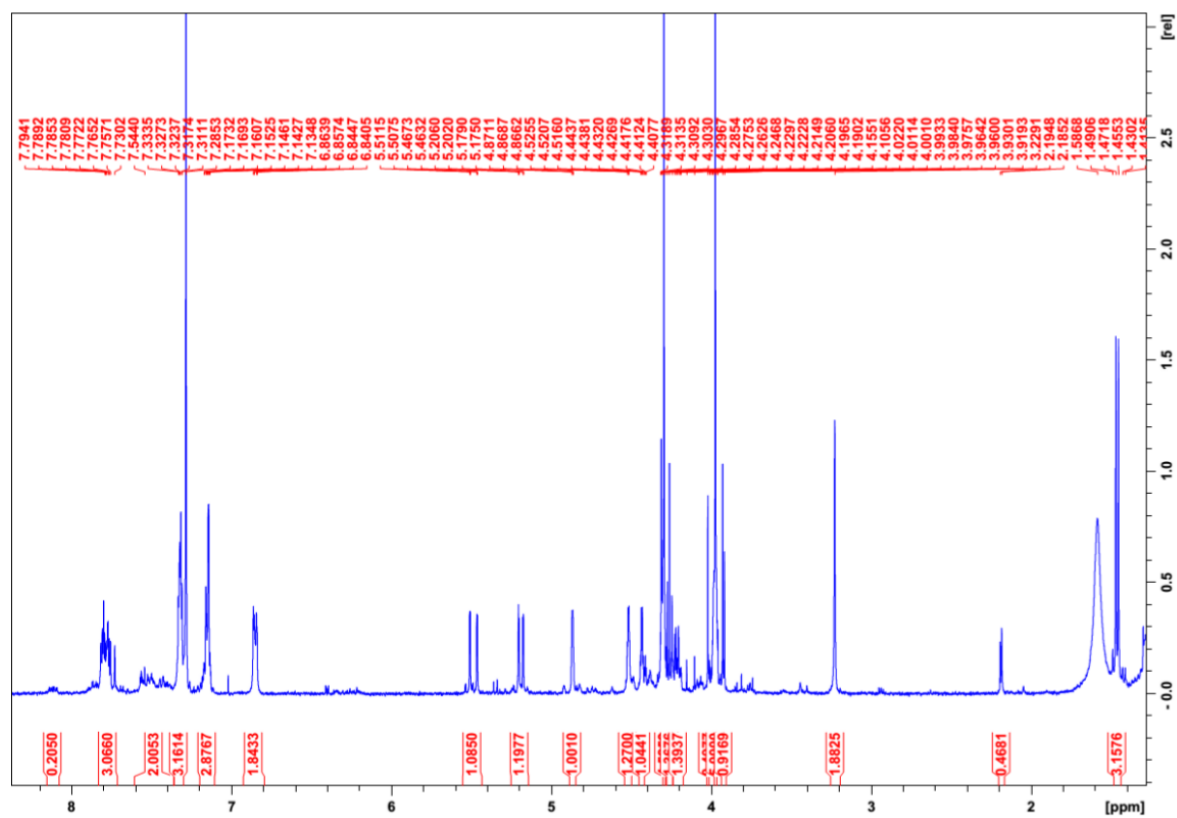


Figure S28

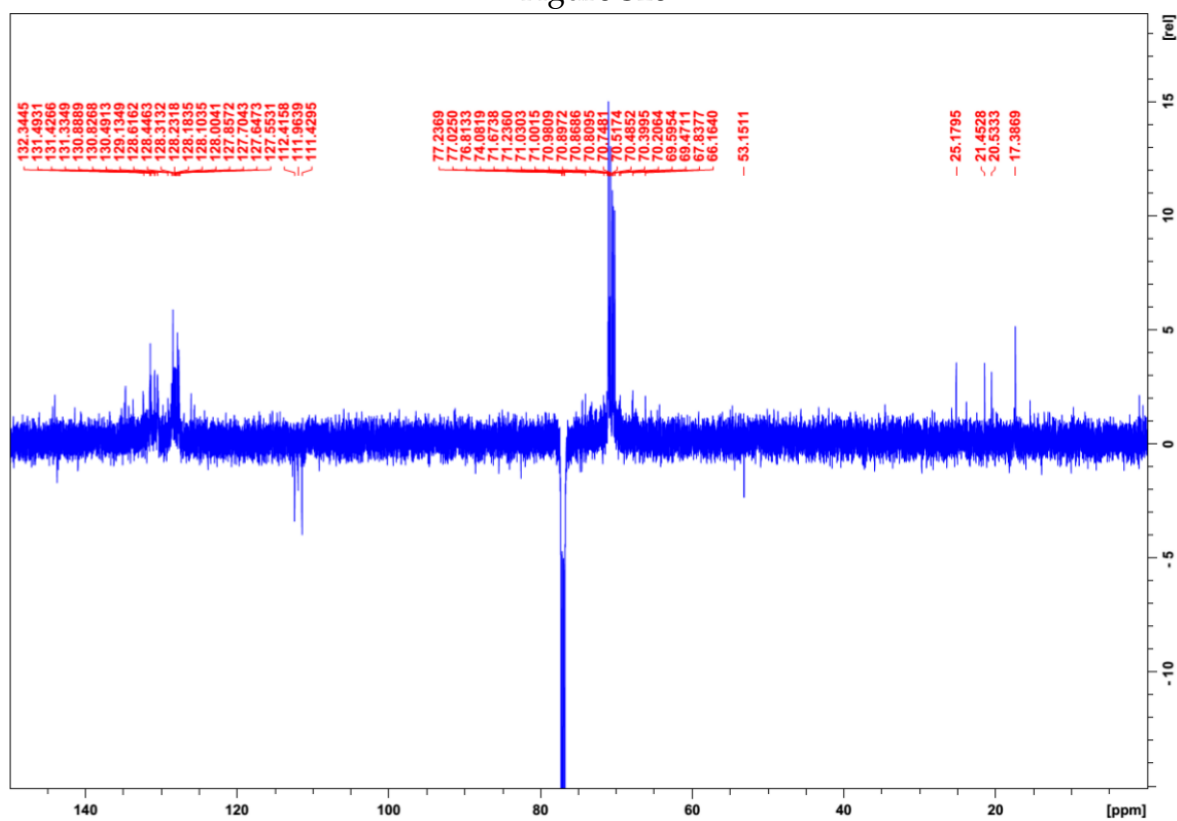


Figure S29

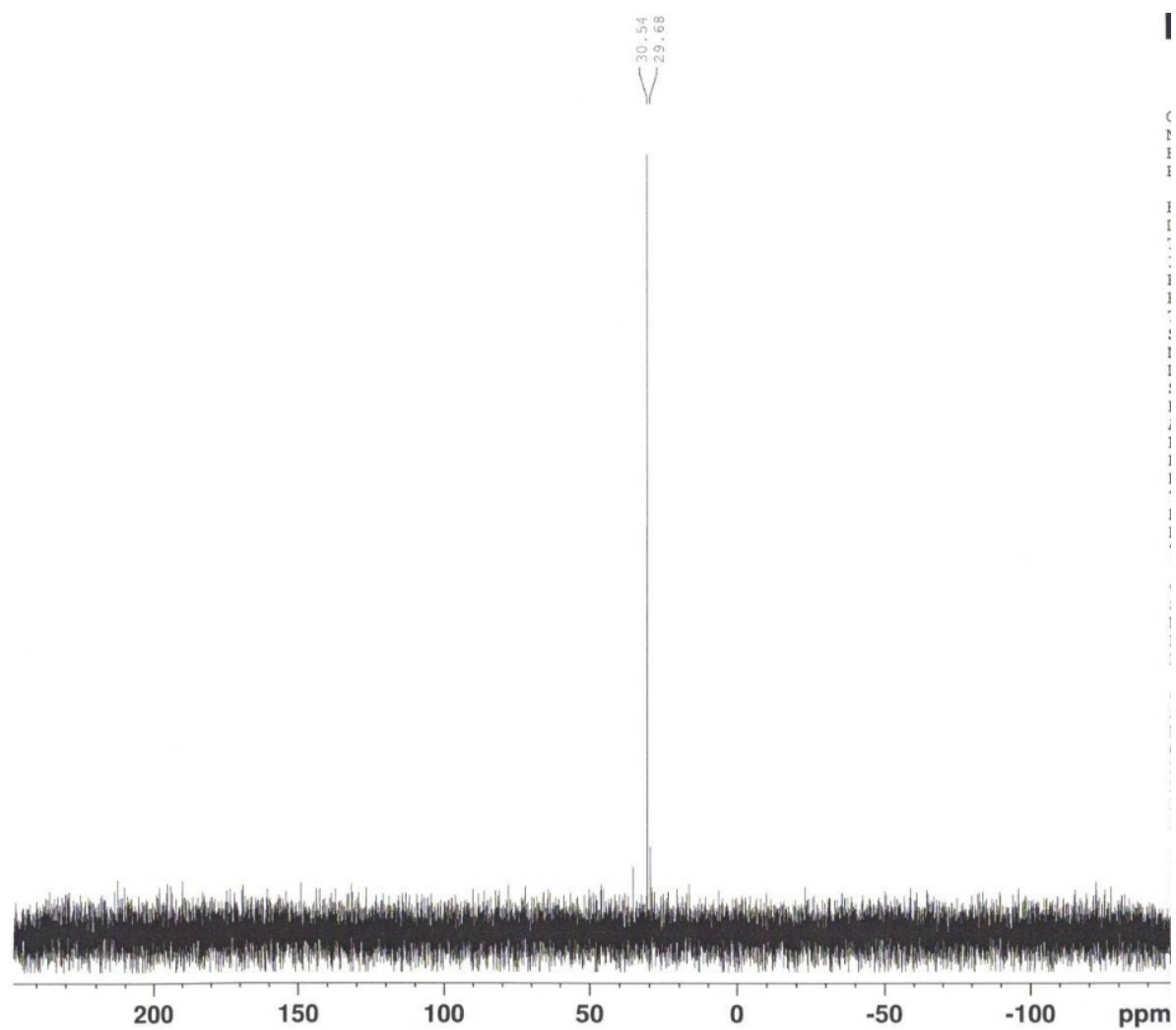


Figure S30

## 11. Side product 10

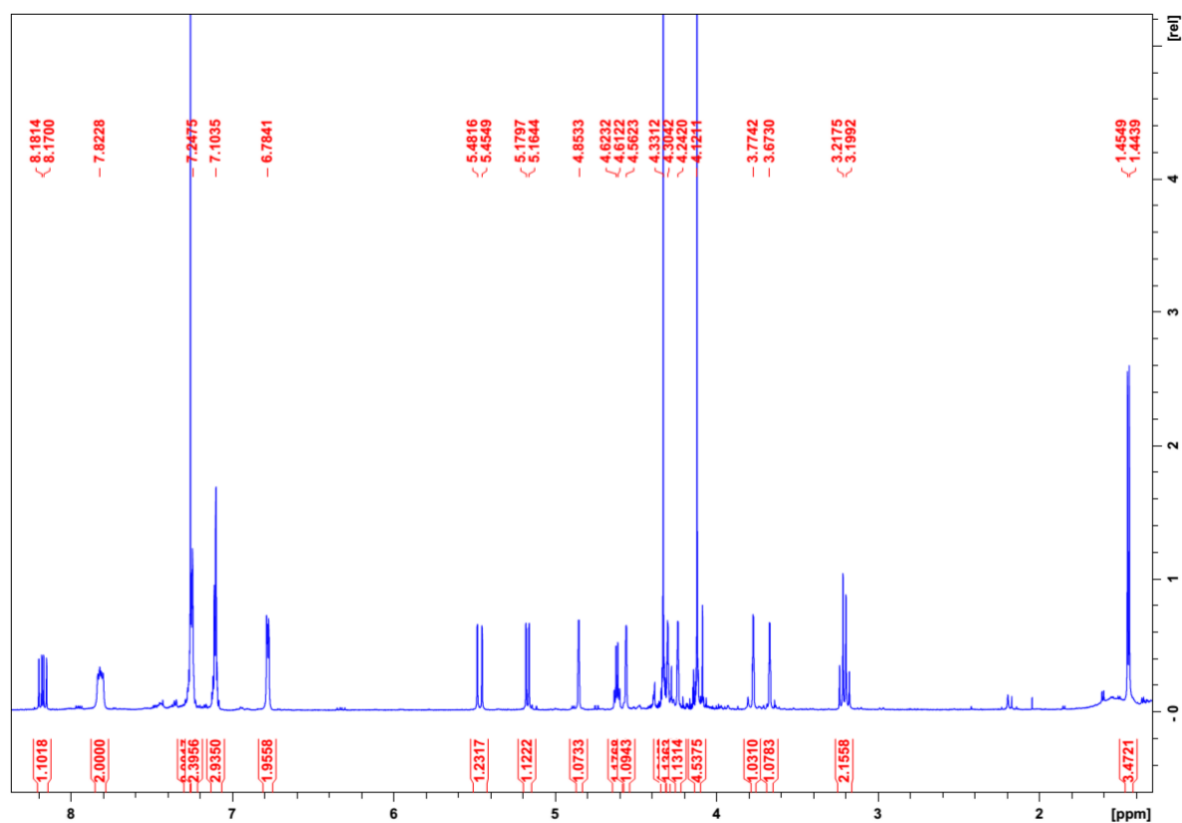


Figure S31

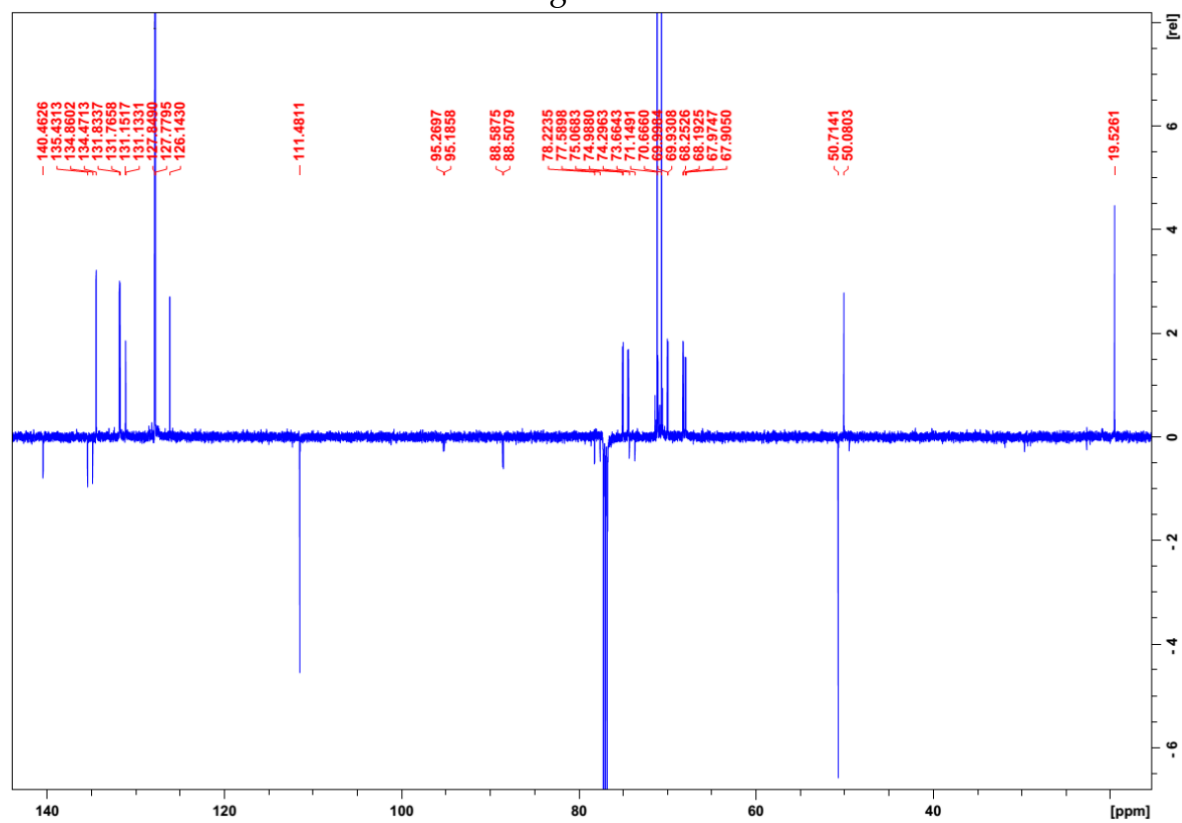


Figure S32