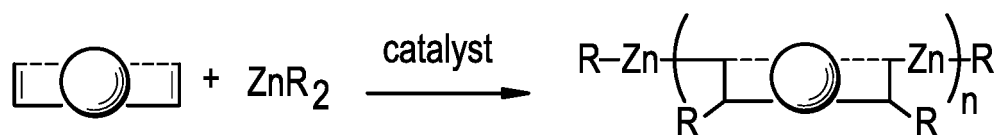


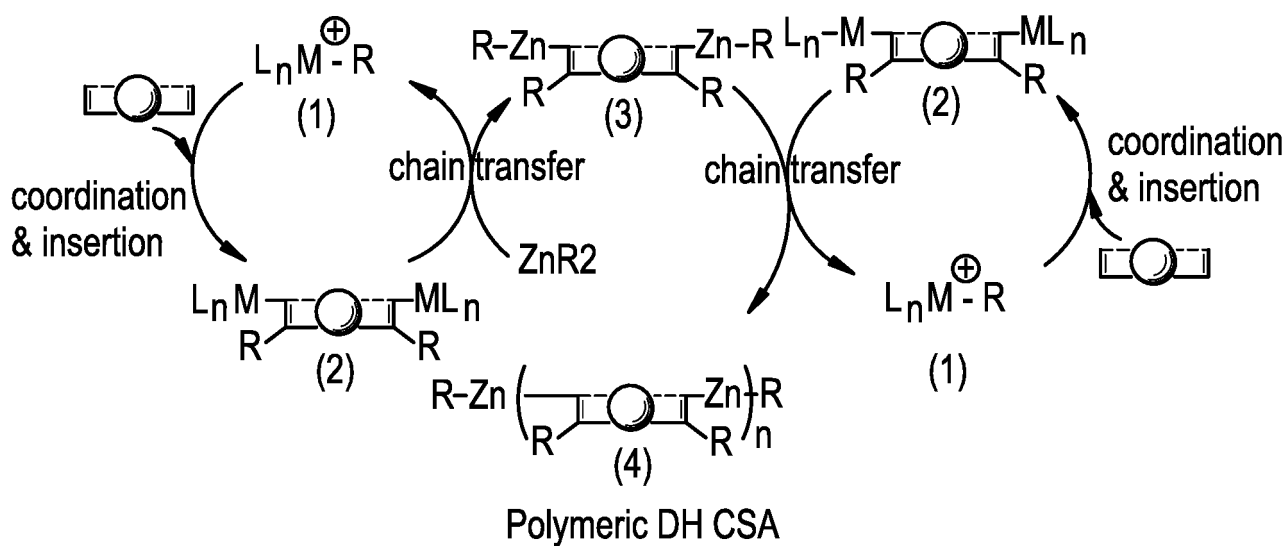
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FIG. 1A

Scheme 1

**FIG. 1B**

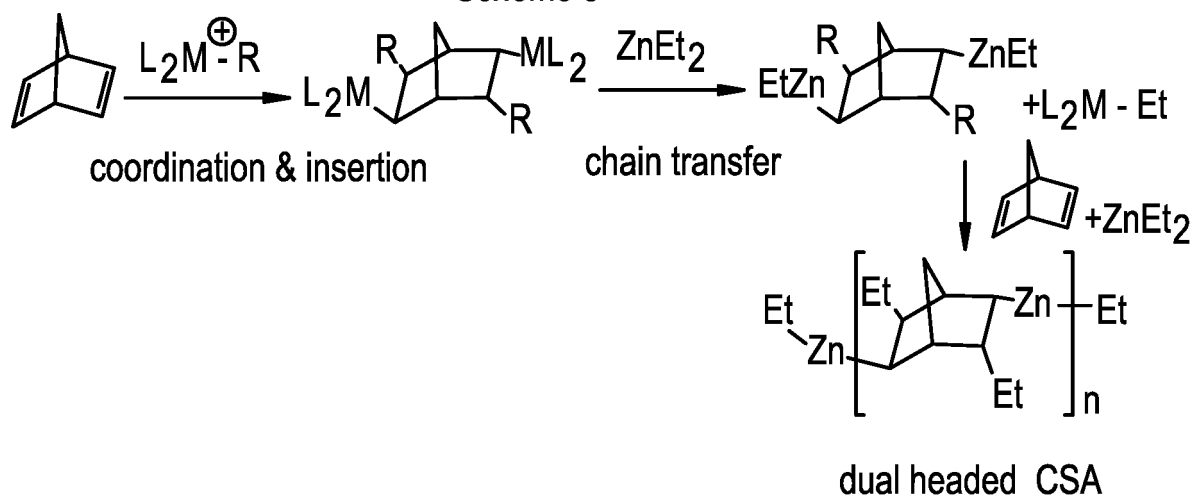
Scheme 2



Polymeric DH CSA

FIG. 1C

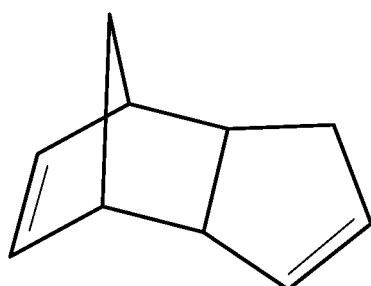
Scheme 3



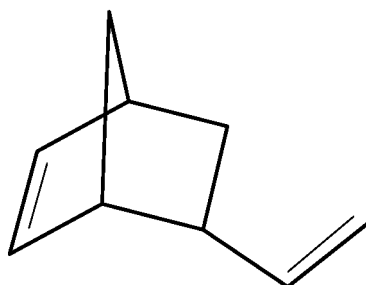
dual headed CSA

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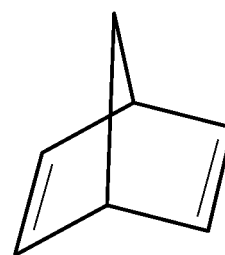
FIG. 2



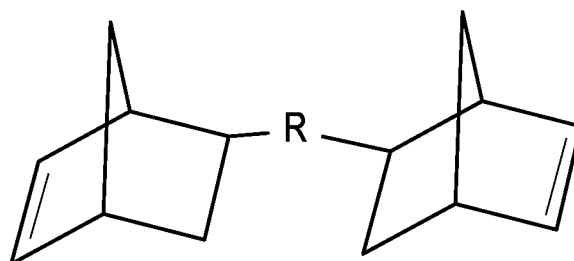
Dicyclopentadiene



5-vinyl-2-norbornene

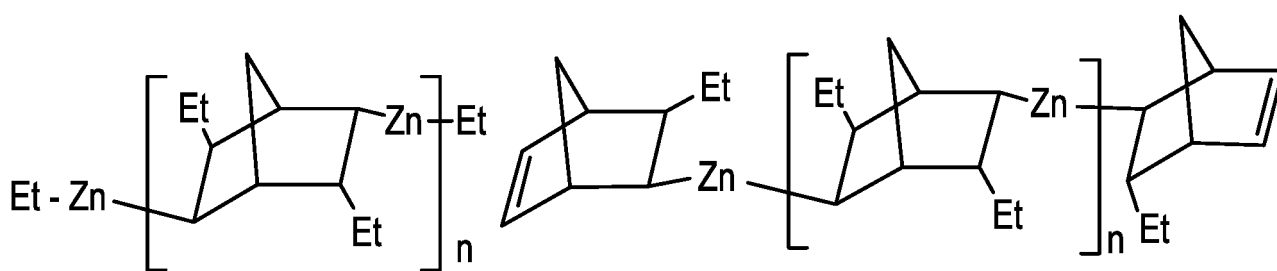
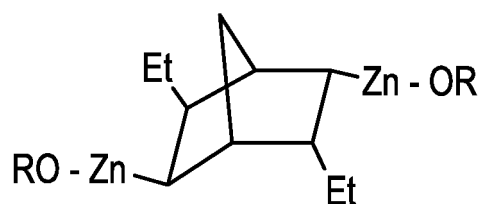
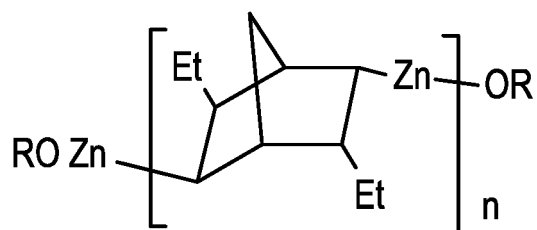


Norbornadiene



bis-norbornene (general formula)

FIG. 3

(a) $\text{Et}_2\text{Zn}, \text{Et}_2\text{Zn}/\text{dialkene} > 1$ (b) $\text{Et}_2\text{Zn}, \text{Et}_2\text{Zn}/\text{dialkene} < 1$ (c) EtZnOR (d) $\text{Et}_2\text{Zn}/\text{Et ZnOR}$ mixture

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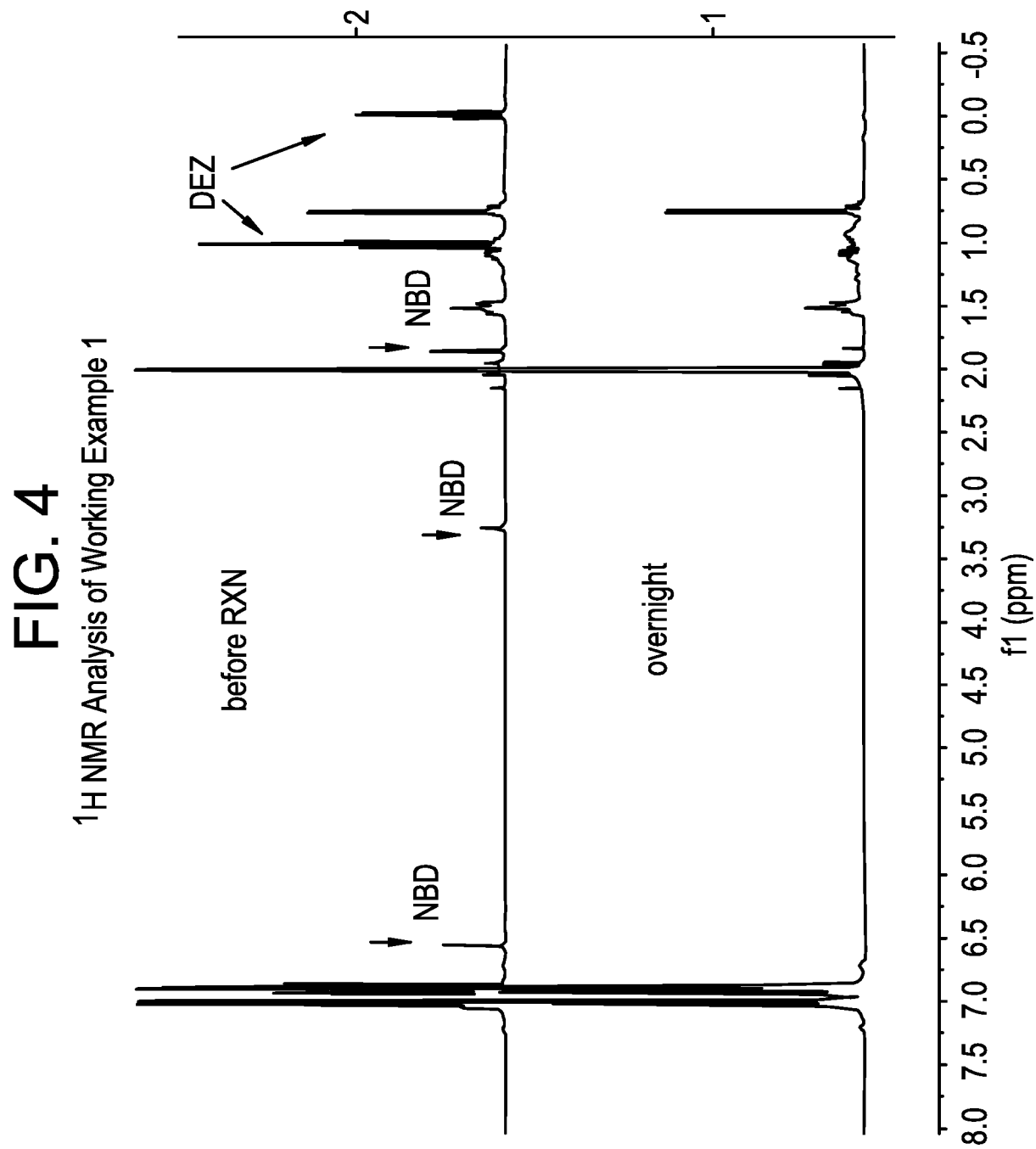


FIG. 5A

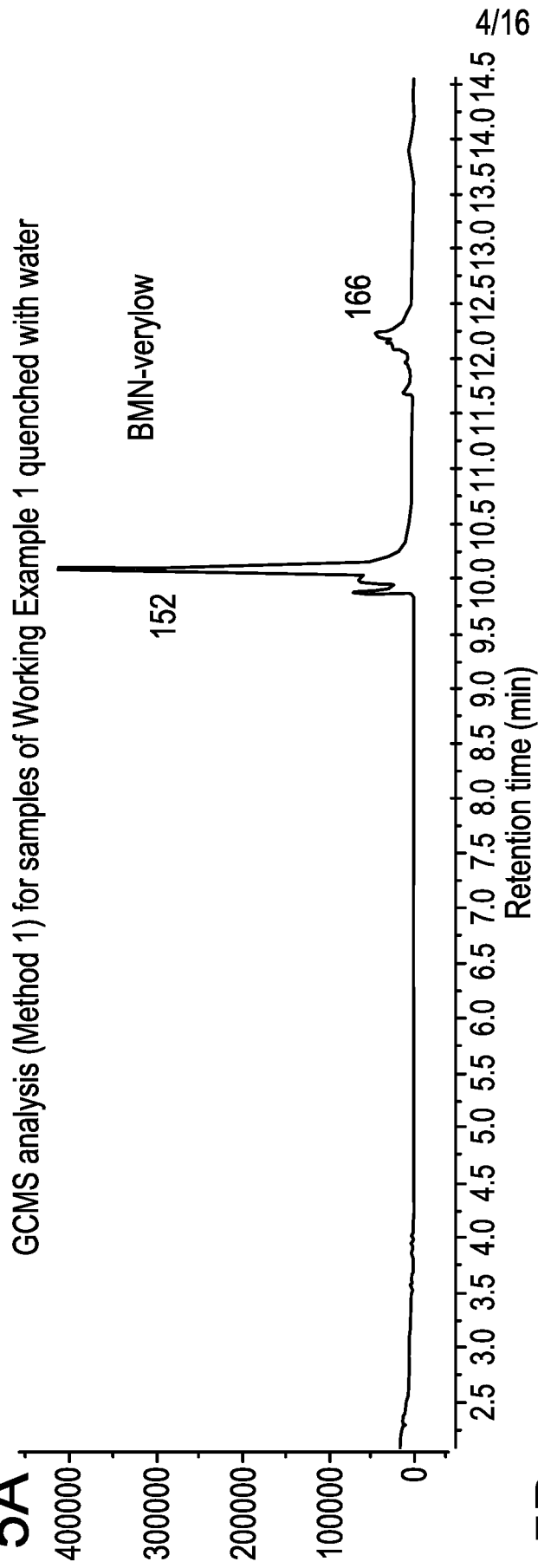
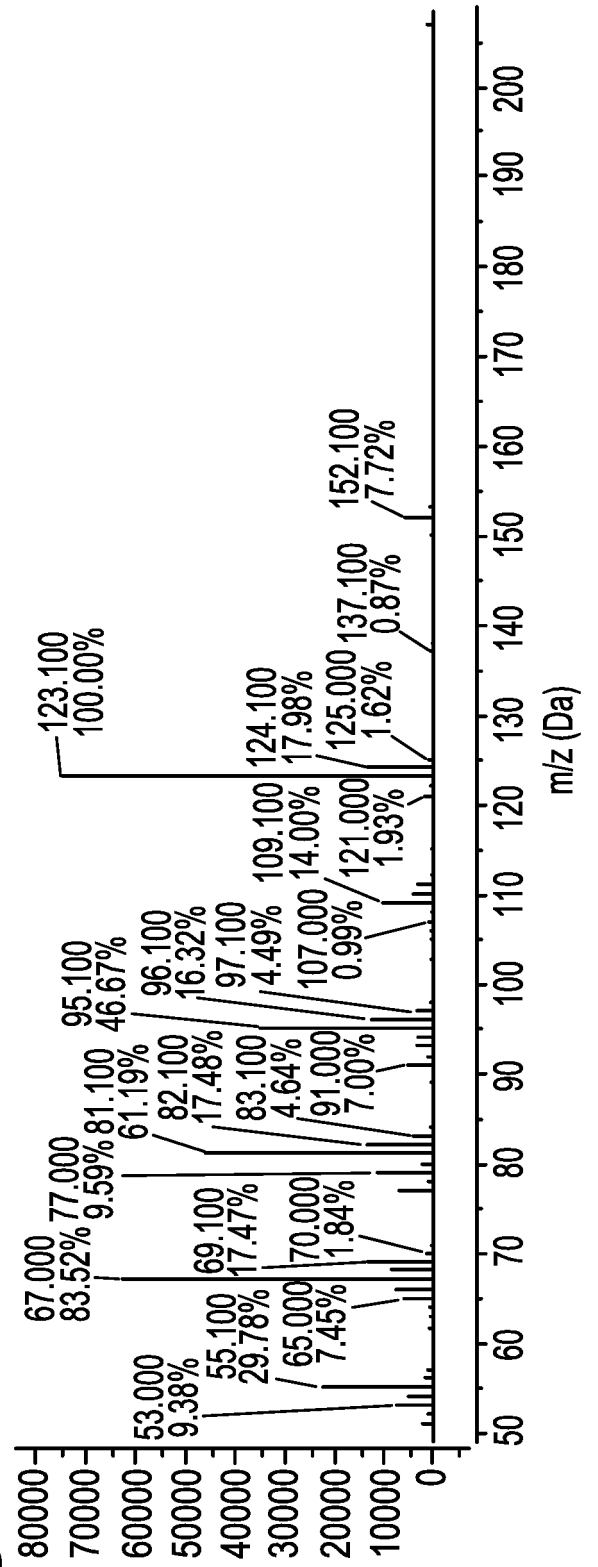


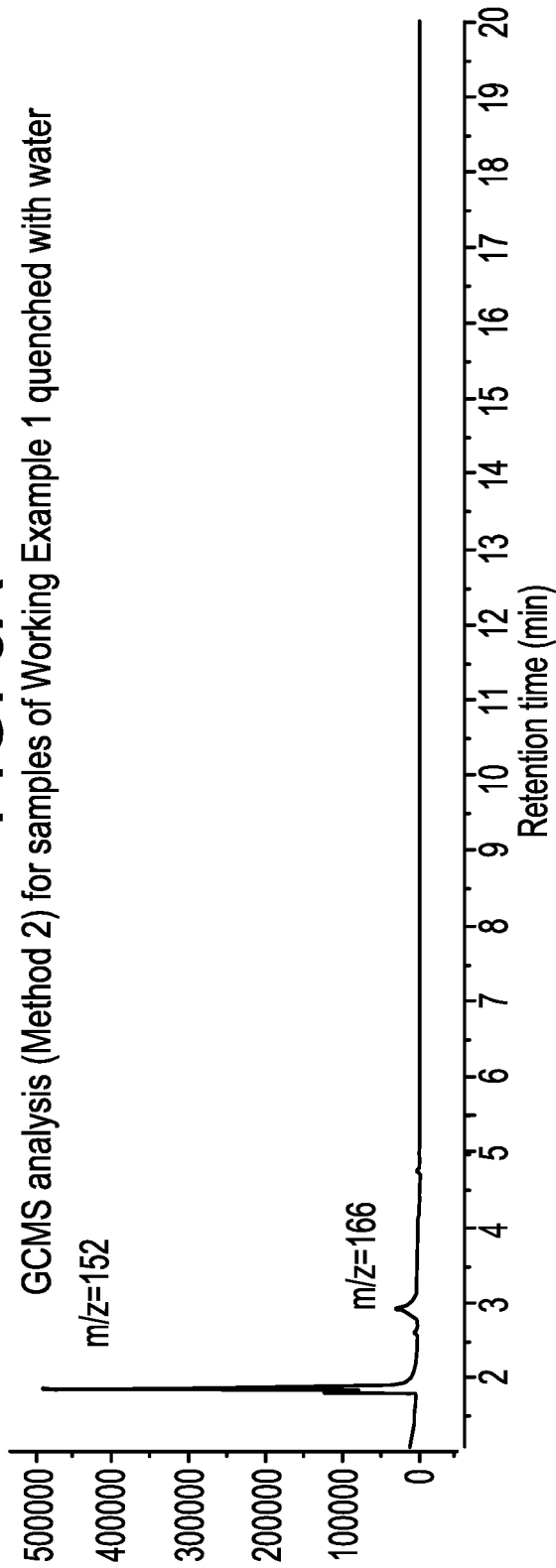
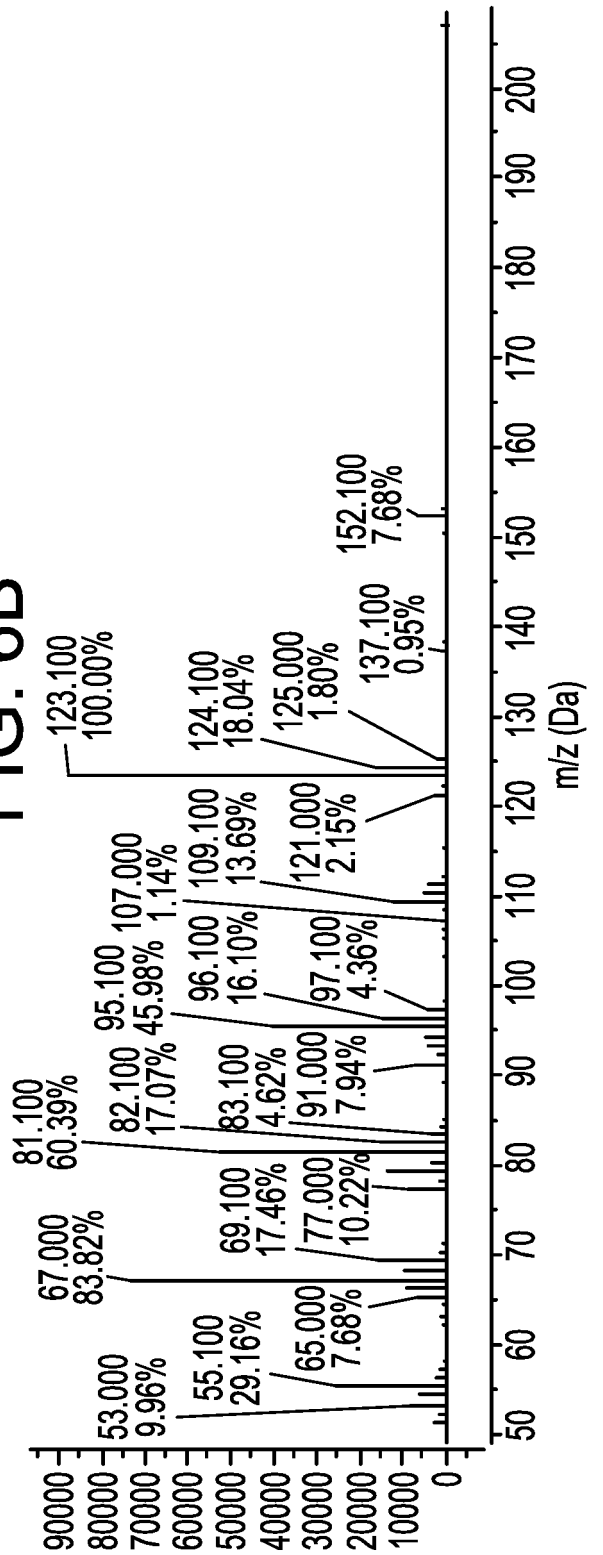
FIG. 5B



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FIG. 6A

GCMS analysis (Method 2) for samples of Working Example 1 quenched with water

**FIG. 6B**

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FIG. 7A

GCMS analysis (Method 2) for samples of Working Example 1 quenched with methanol

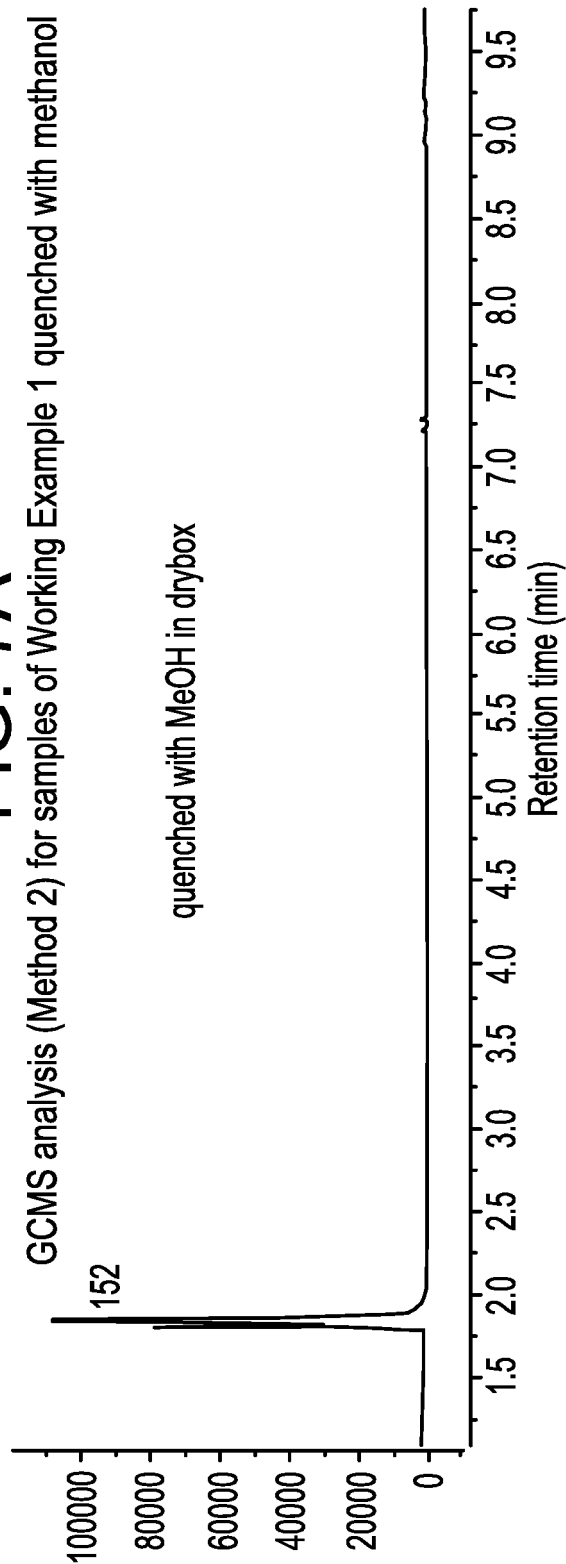
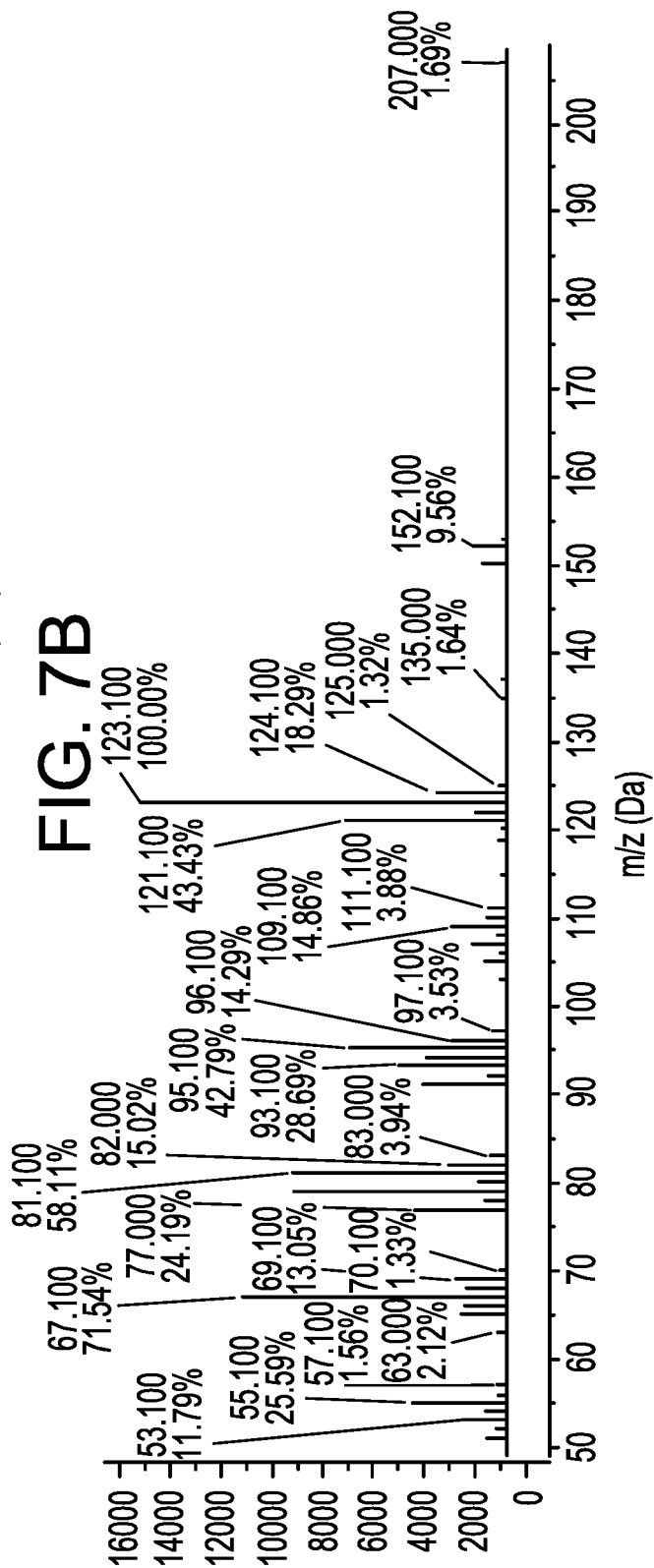


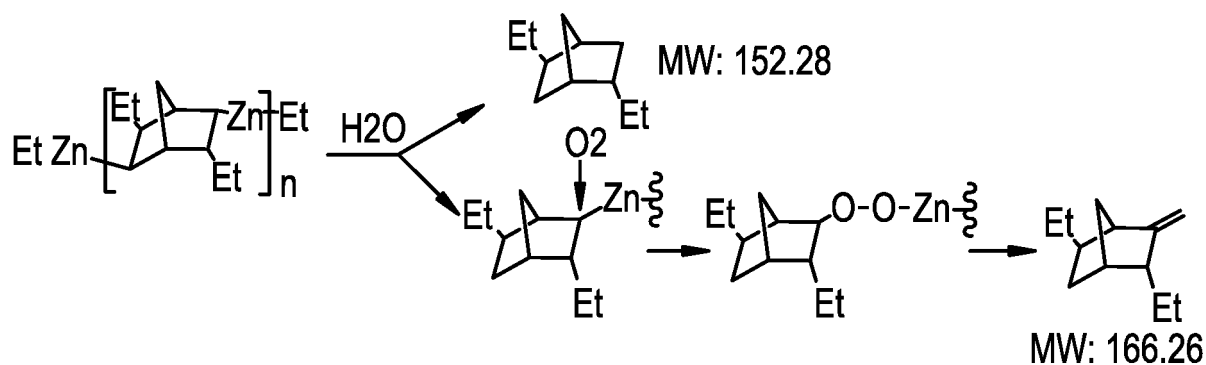
FIG. 7B



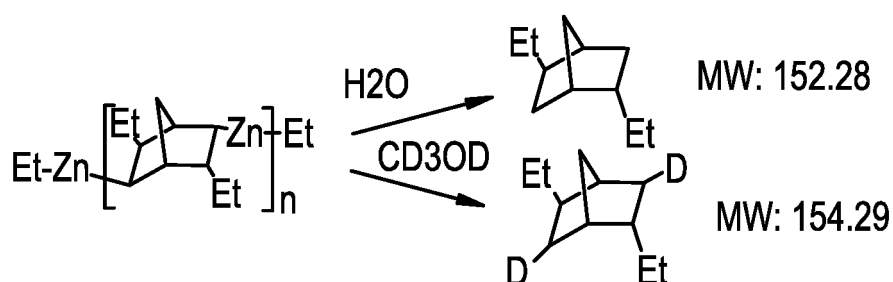
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FIG. 8A

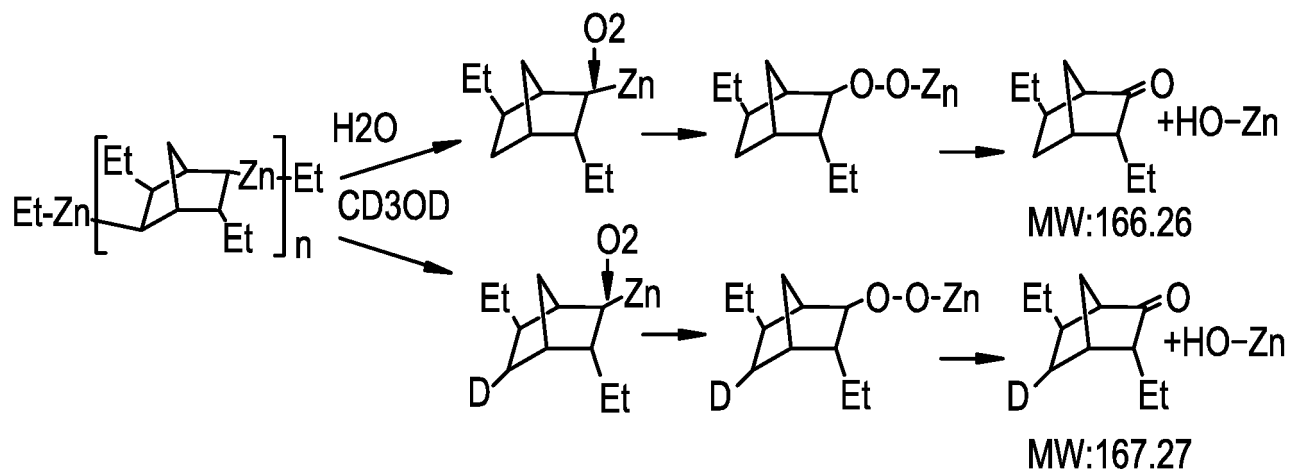
Scheme 1

**FIG. 8B**

Scheme 2

**FIG. 8C**

Scheme 3



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FIG. 9A

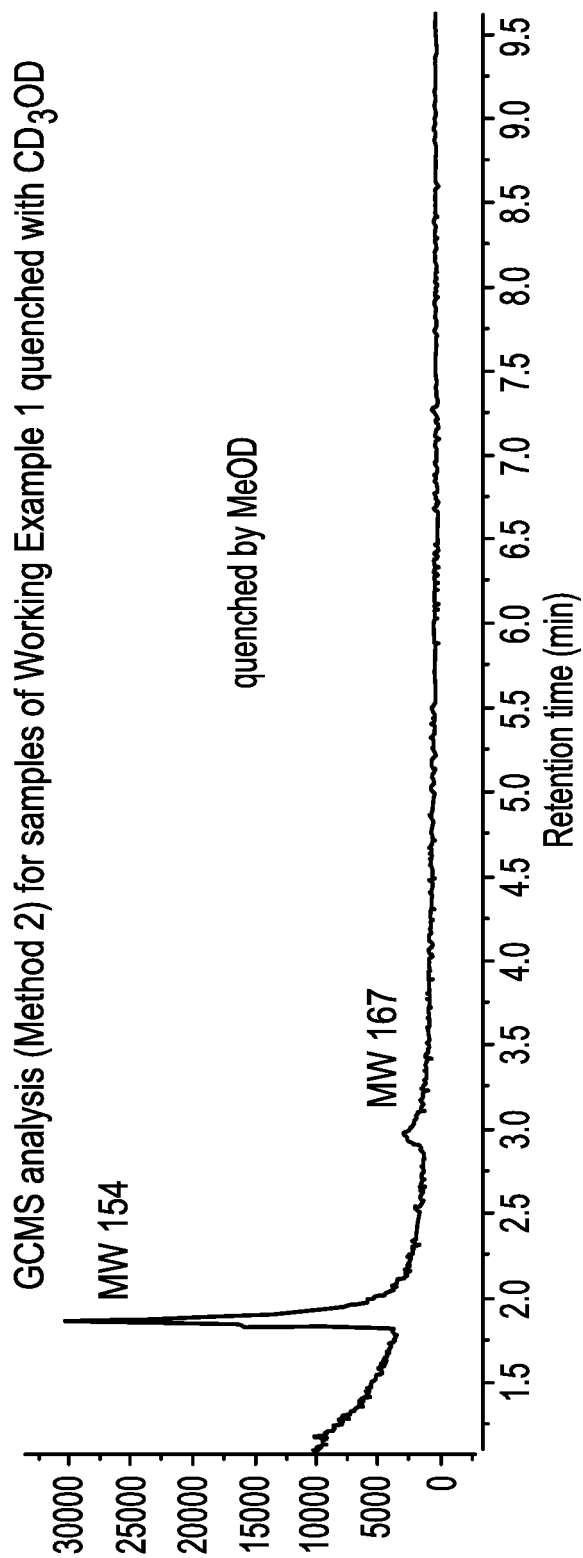
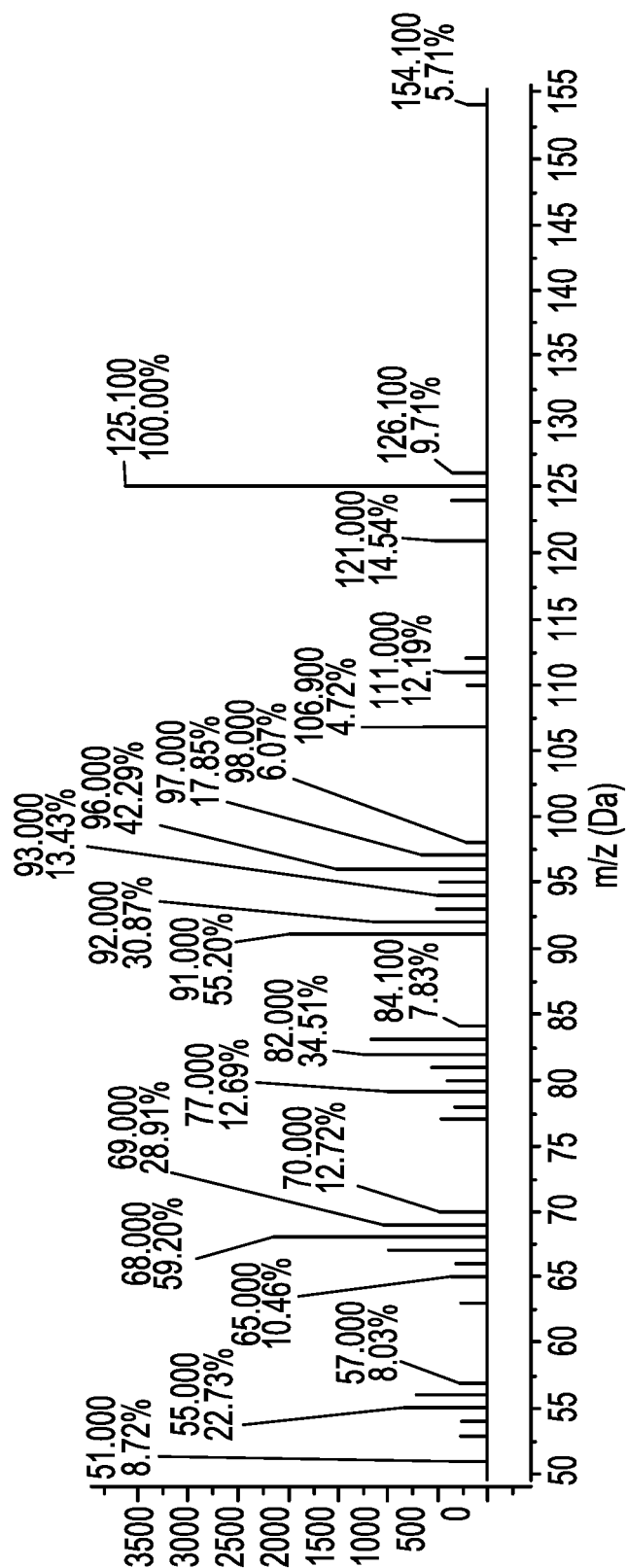


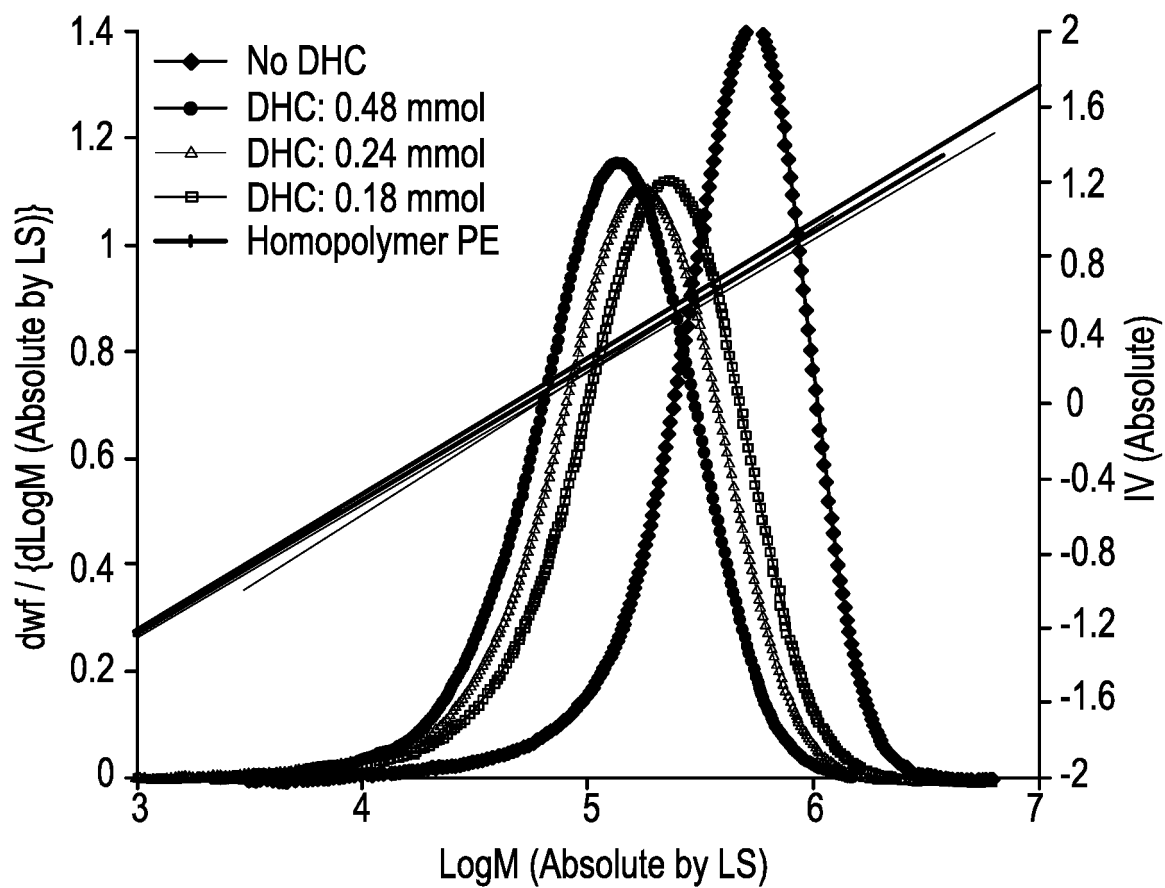
FIG. 9B



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FIG. 10

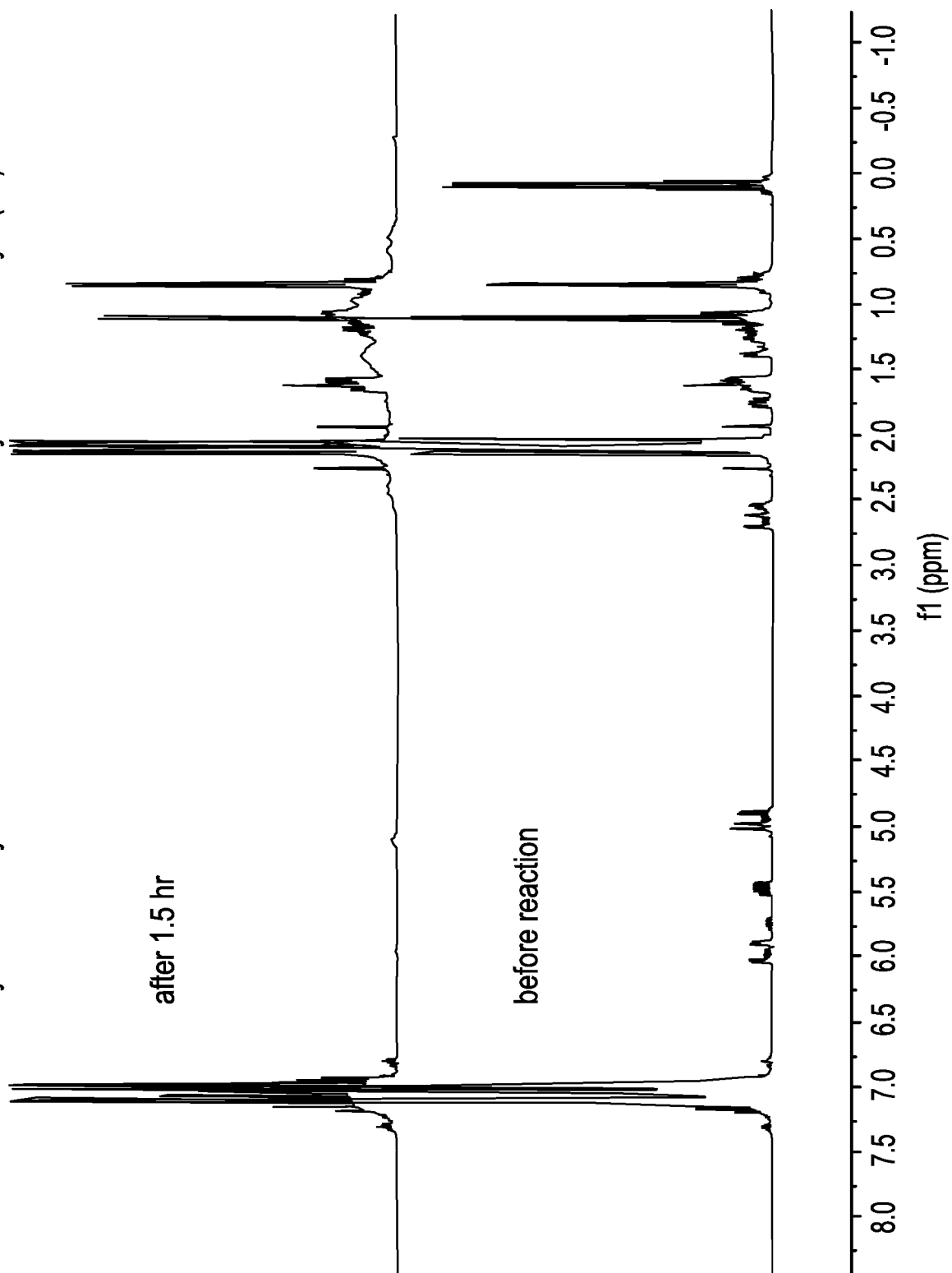
GPC curve of EO copolymer made with the dual-headed composition of Working Example 1



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FIG. 11

¹H NMR analysis of 5-vinyl-2-norbornene reacted with diethylzinc and Catalyst (A2)



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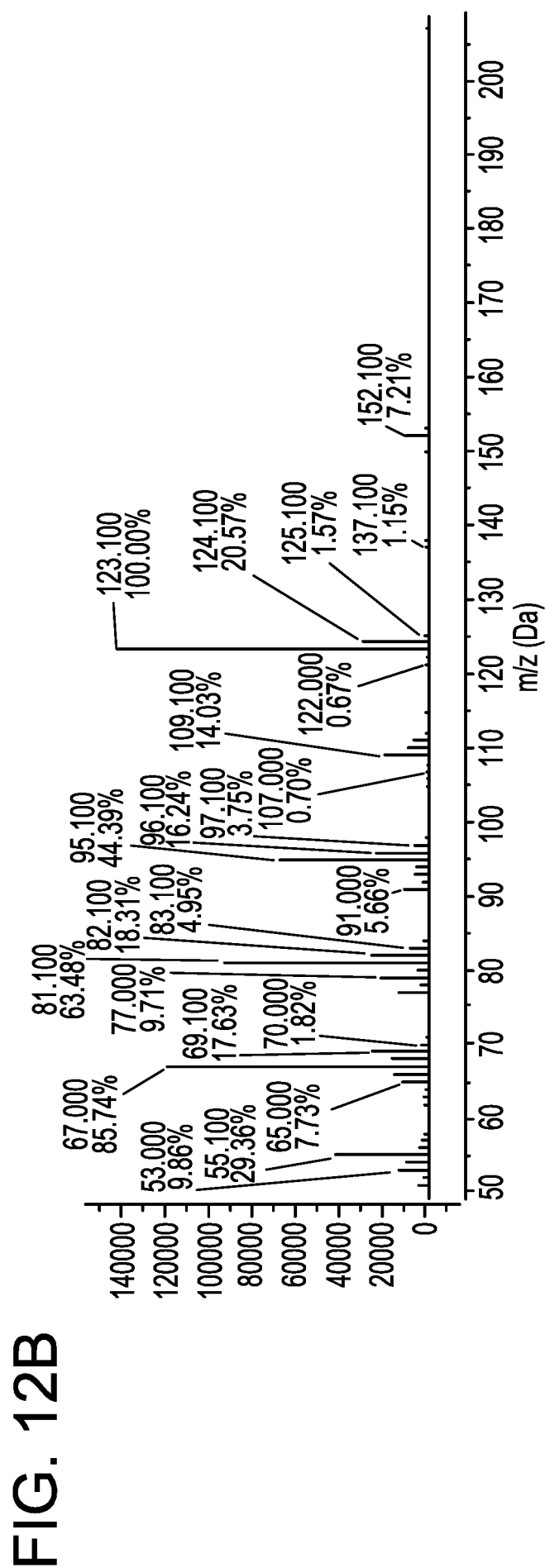
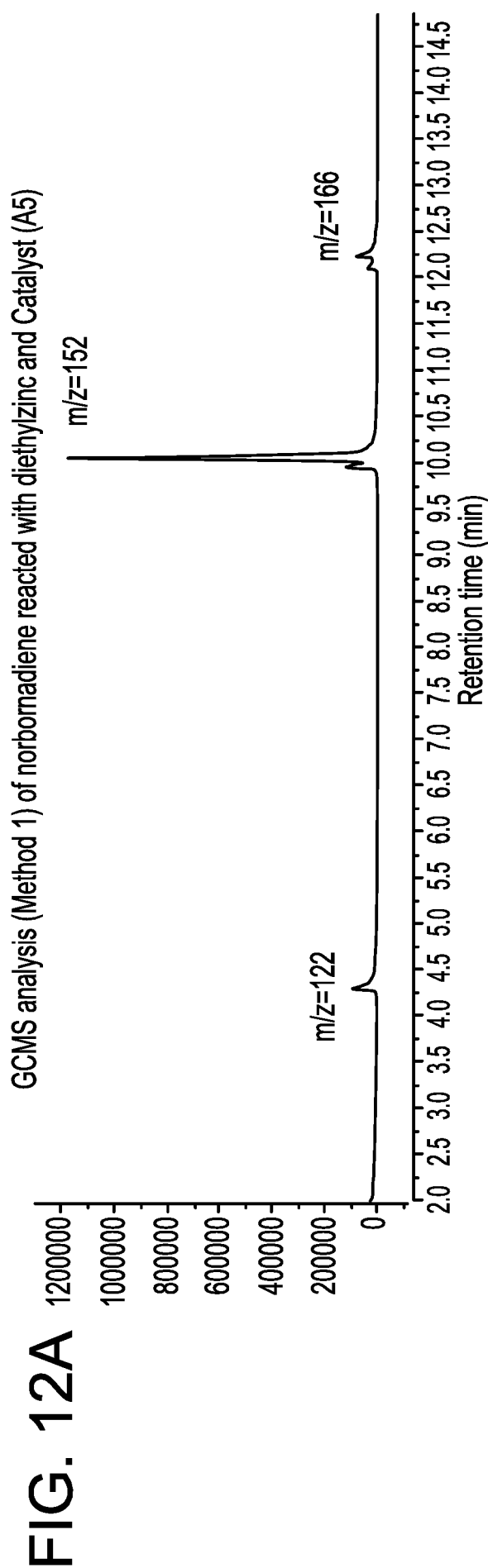
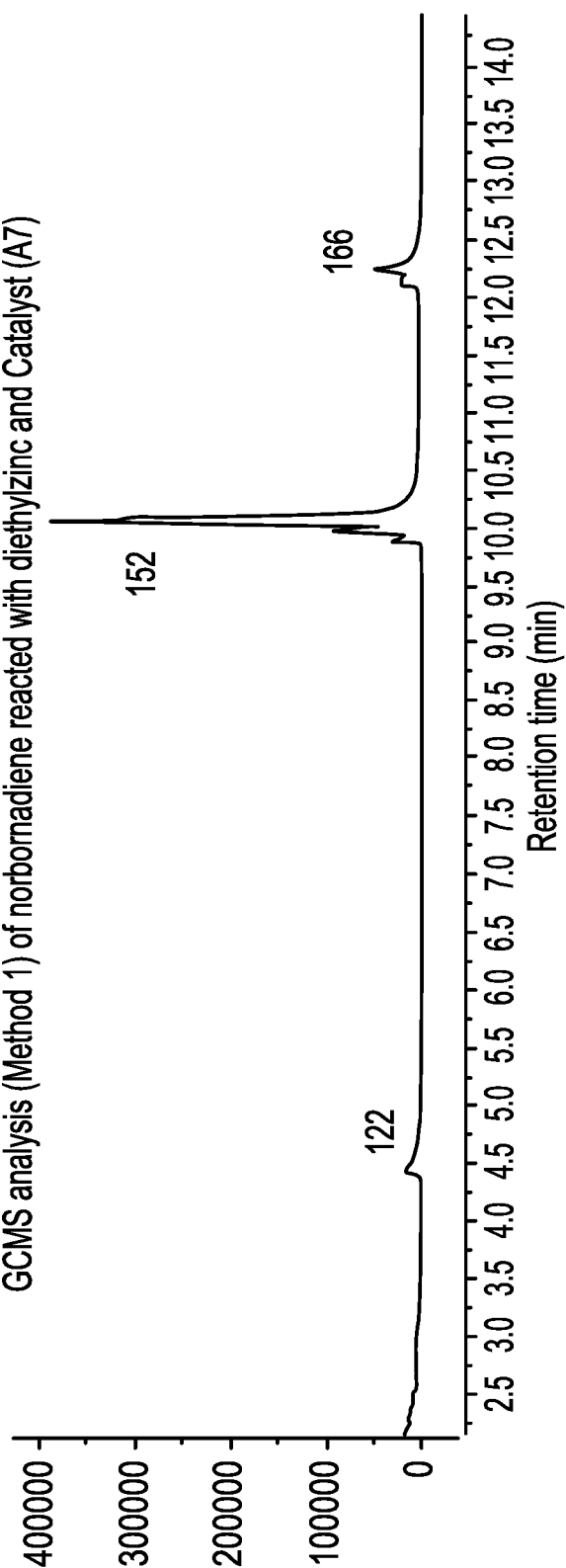


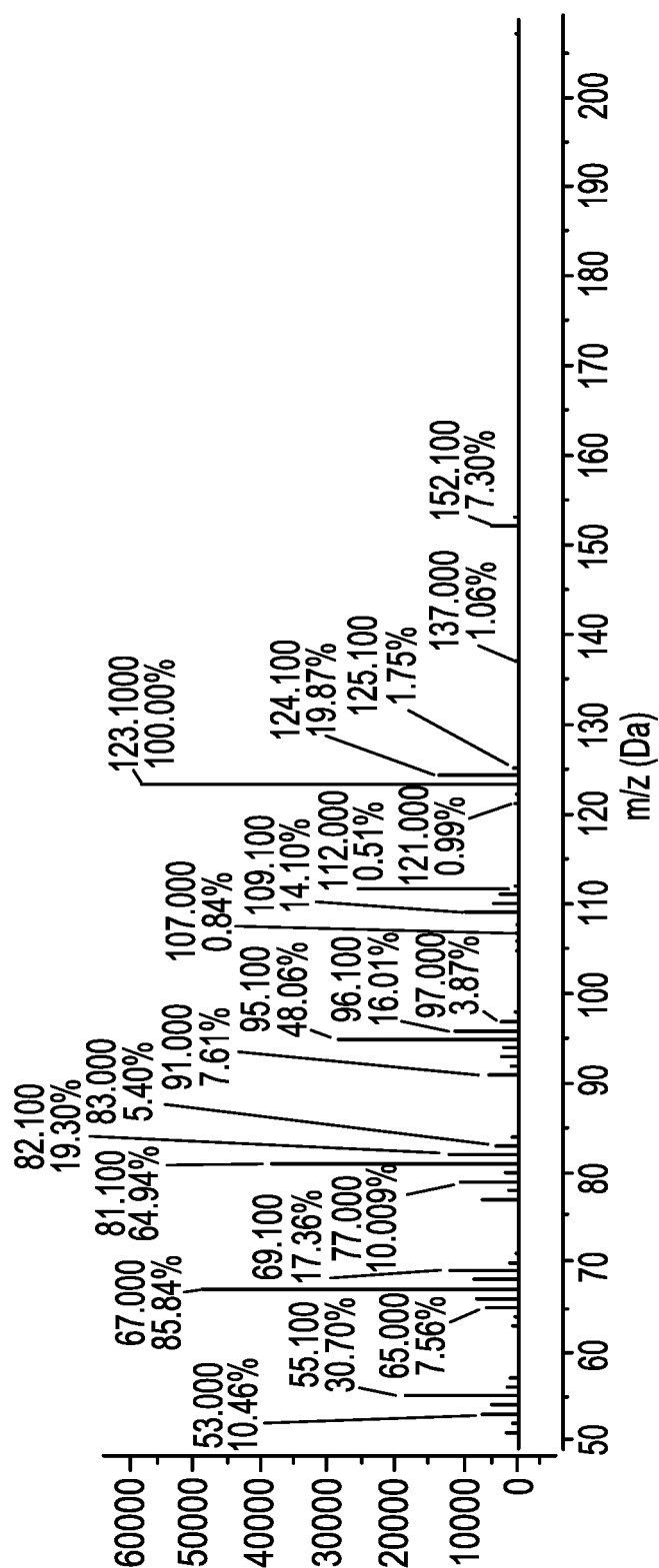
FIG. 13A

GCMS analysis (Method 1) of norbornadiene reacted with diethylzinc and Catalyst (A7)



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FIG. 13B



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FIG. 14A

GCMS analysis (Method 2) of norbornadiene reacted with diethylzinc and Catalyst (A7)

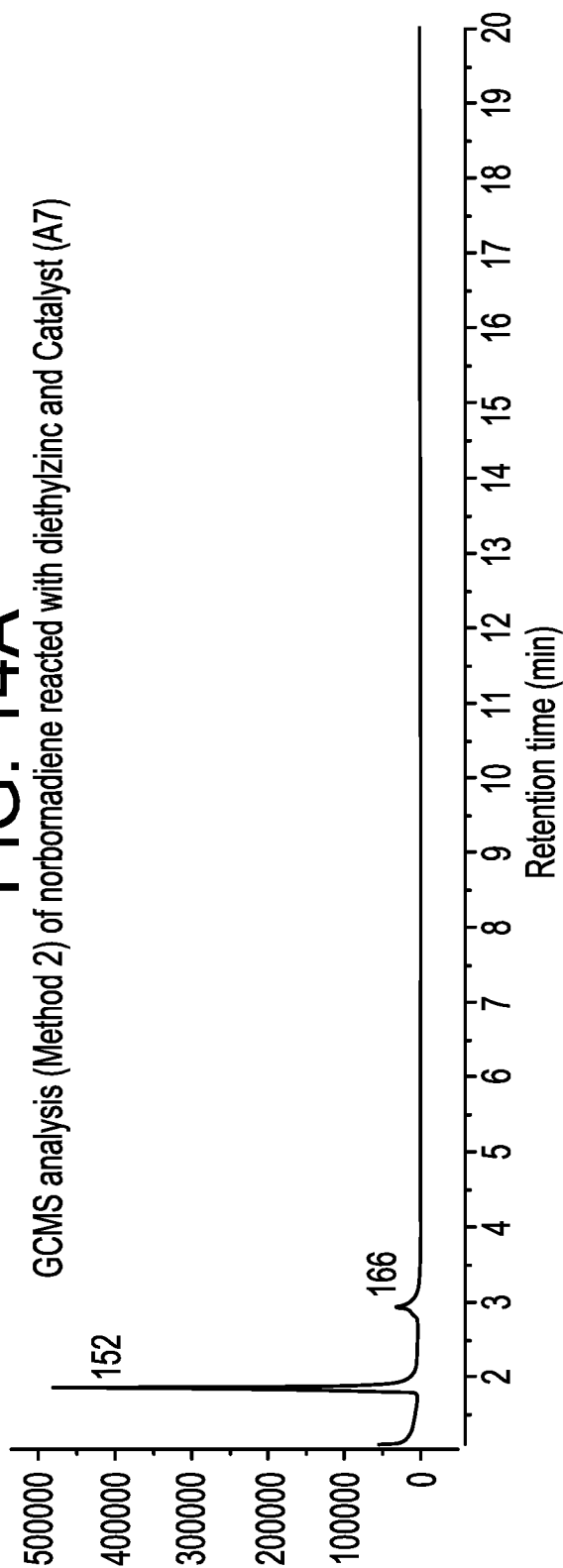


FIG. 14B

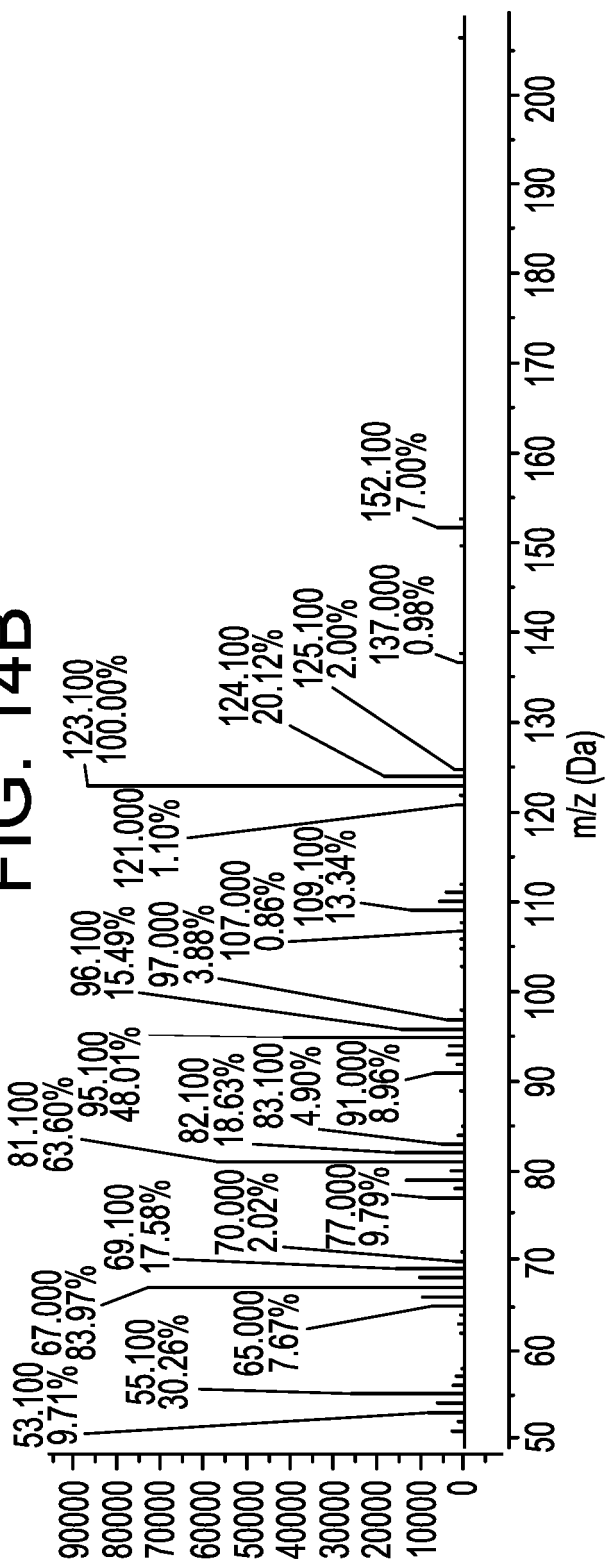
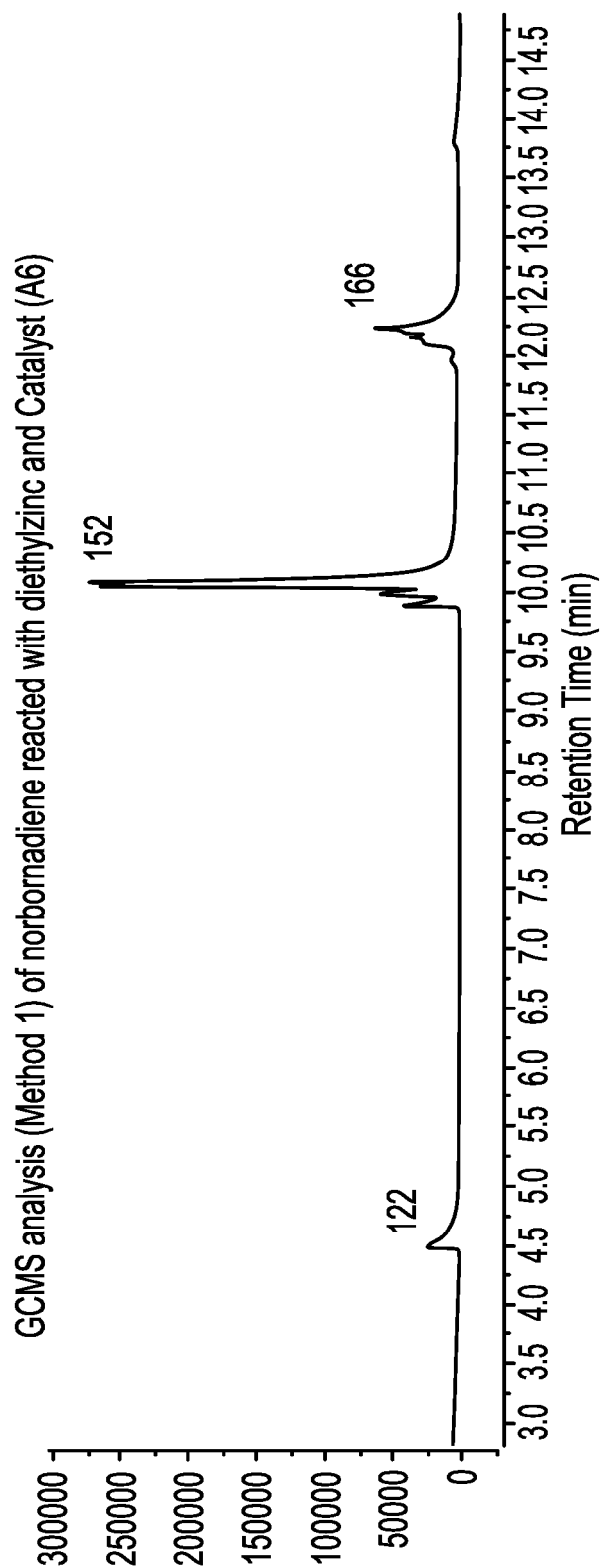


FIG. 15A



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FIG. 15B

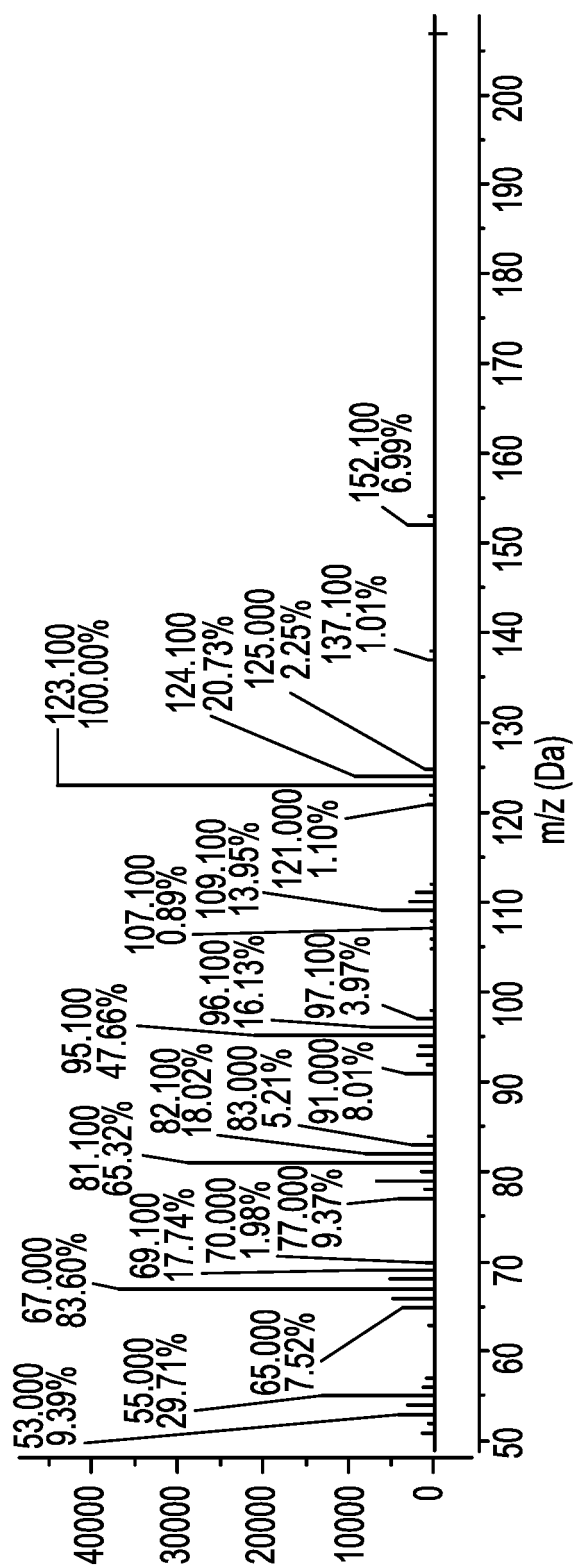
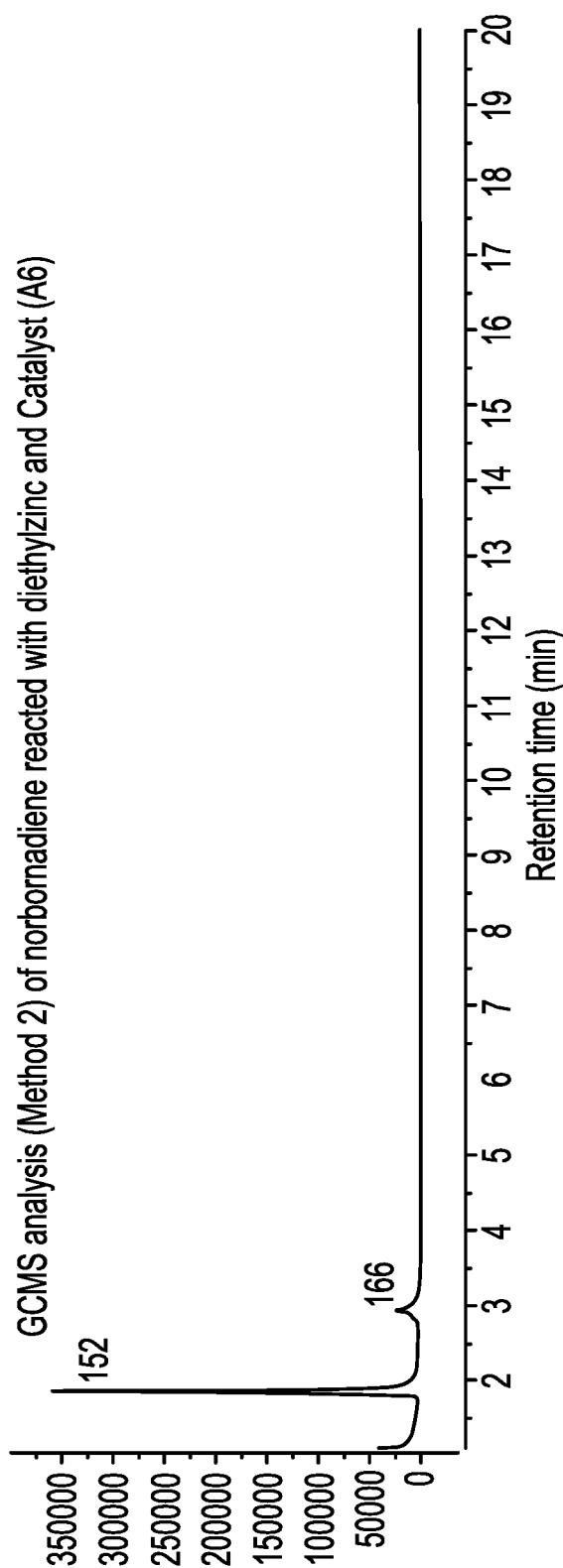
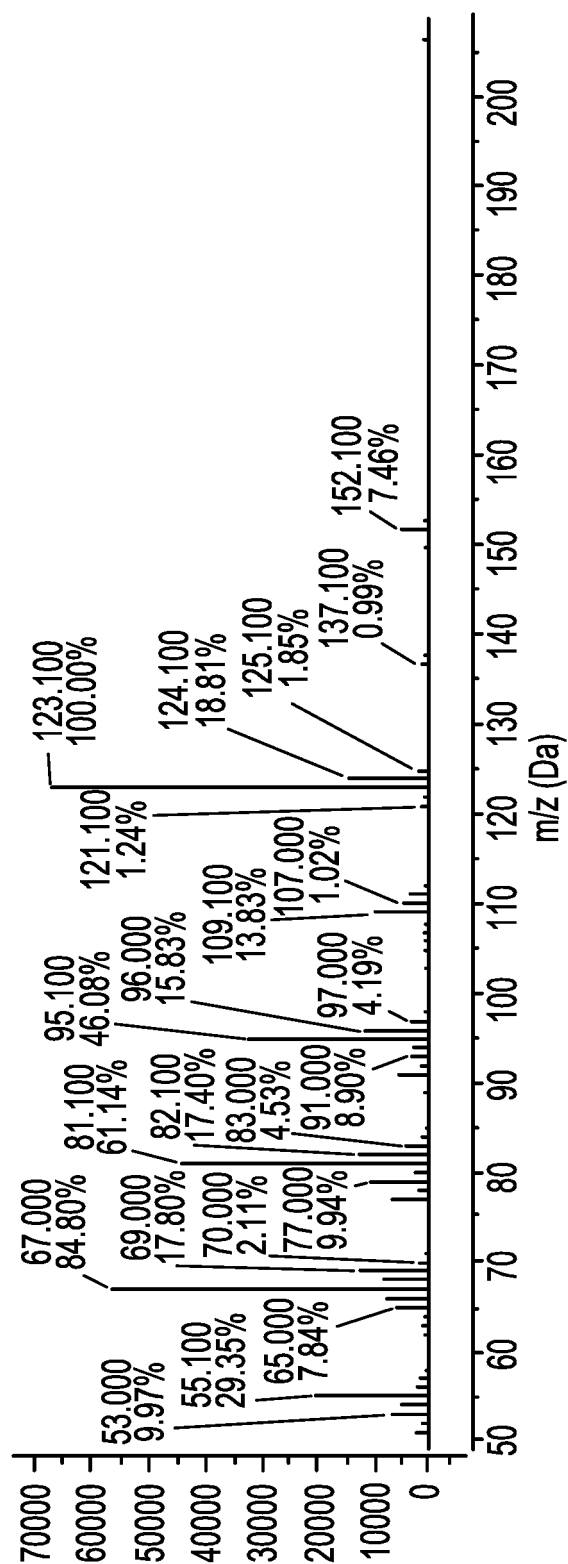


FIG. 16A



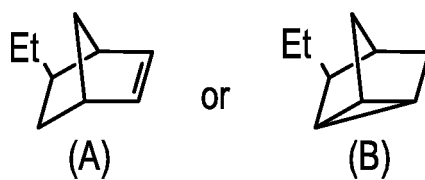
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FIG. 16B



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FIG. 17



MW: 122.21