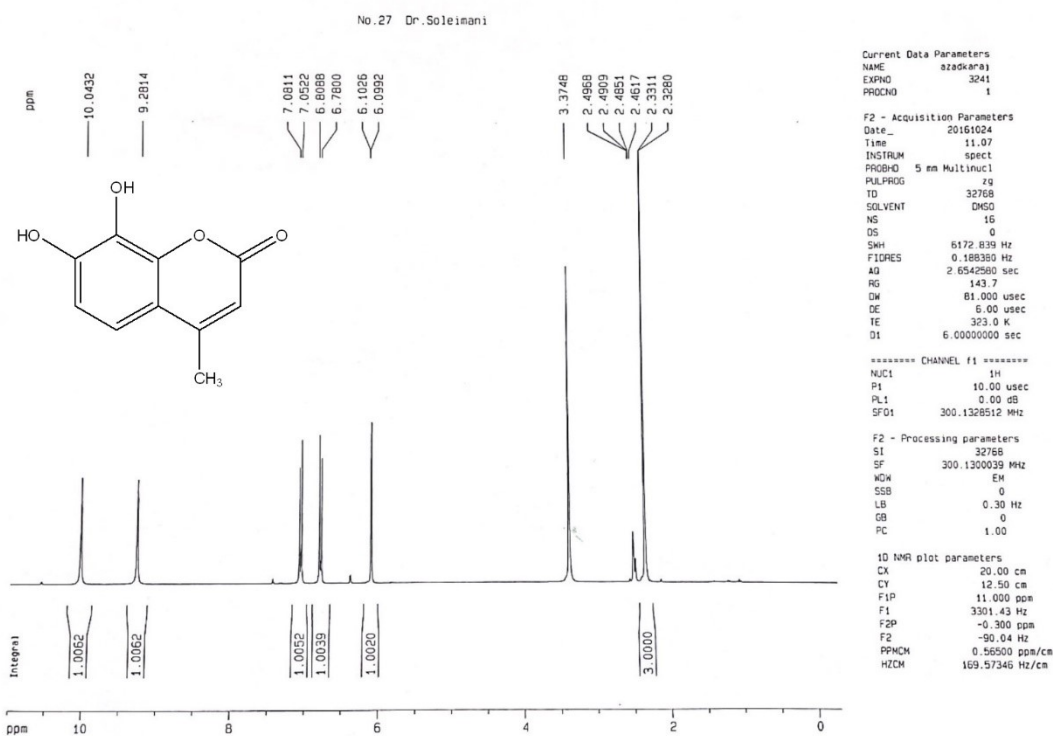


Supporting Information

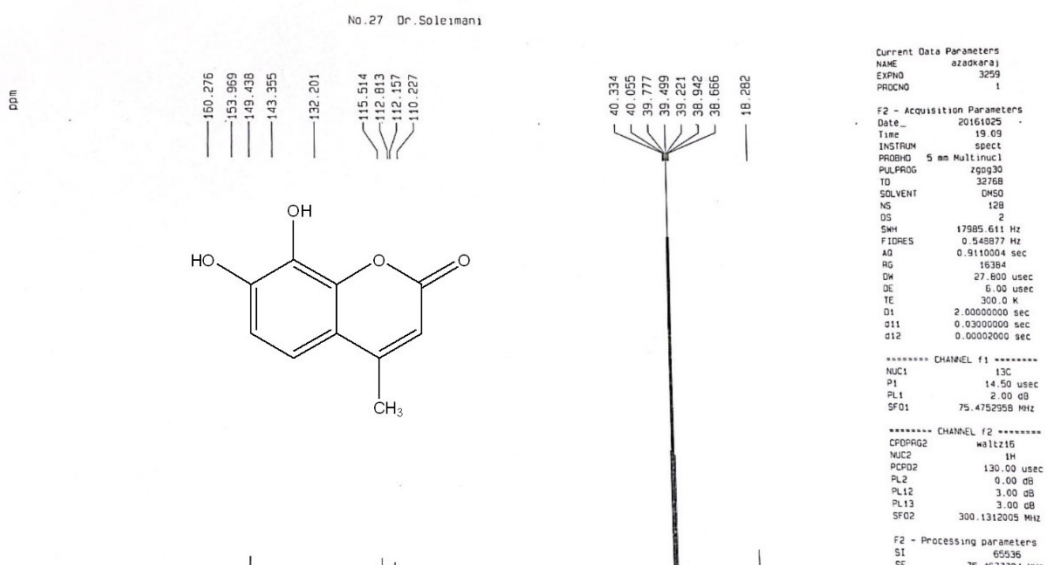
Novel butane sulfonic acid-functionalized core-shell magnetic nanocatalysts for ultrasound-assisted coumarin synthesis

Somayeh Soleimani-Amri^{1*}, Yasaman Salemi¹

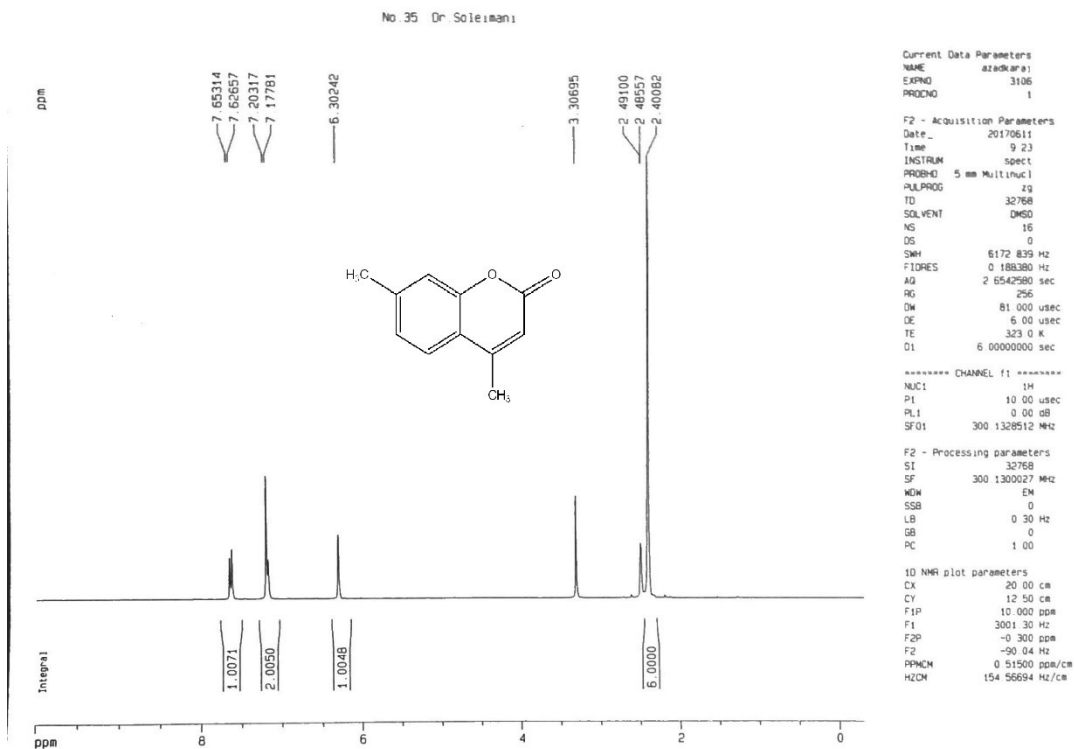
¹Department of Chemistry, Karaj Branch, Islamic Azad University, Karaj, Iran



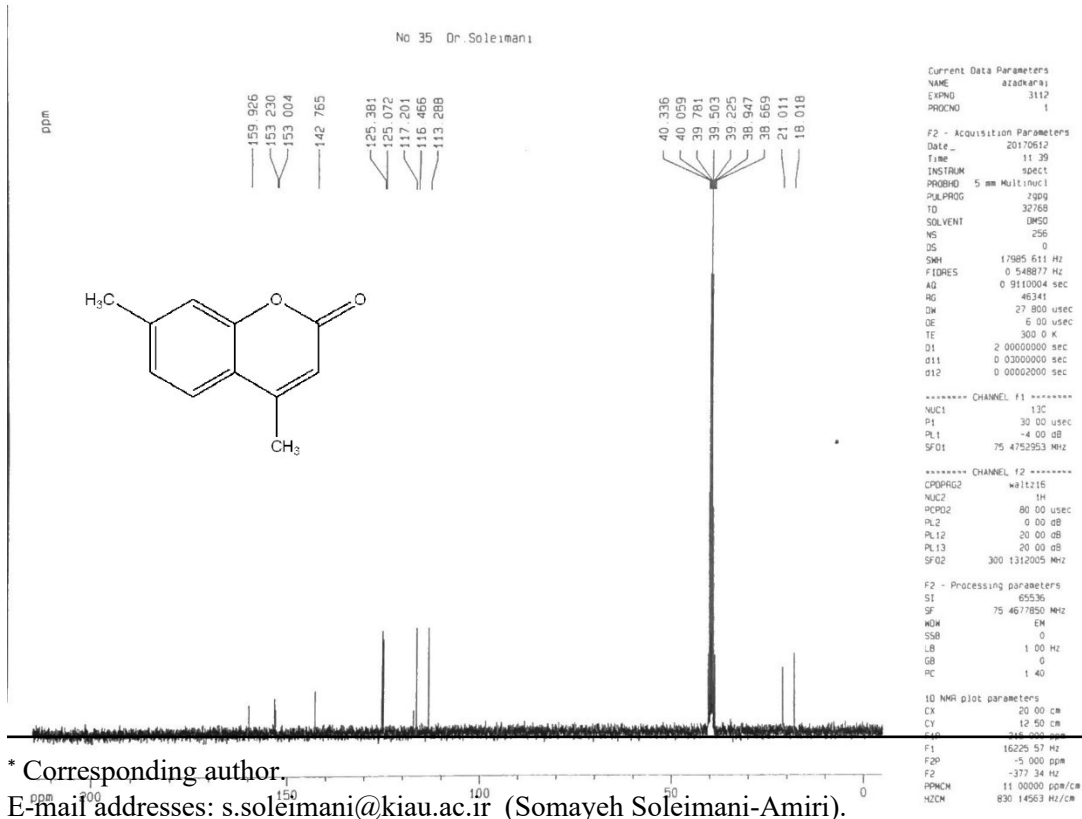
¹H NMR of 7,8-Dihydroxy-4-methylcoumarin (**3b**)



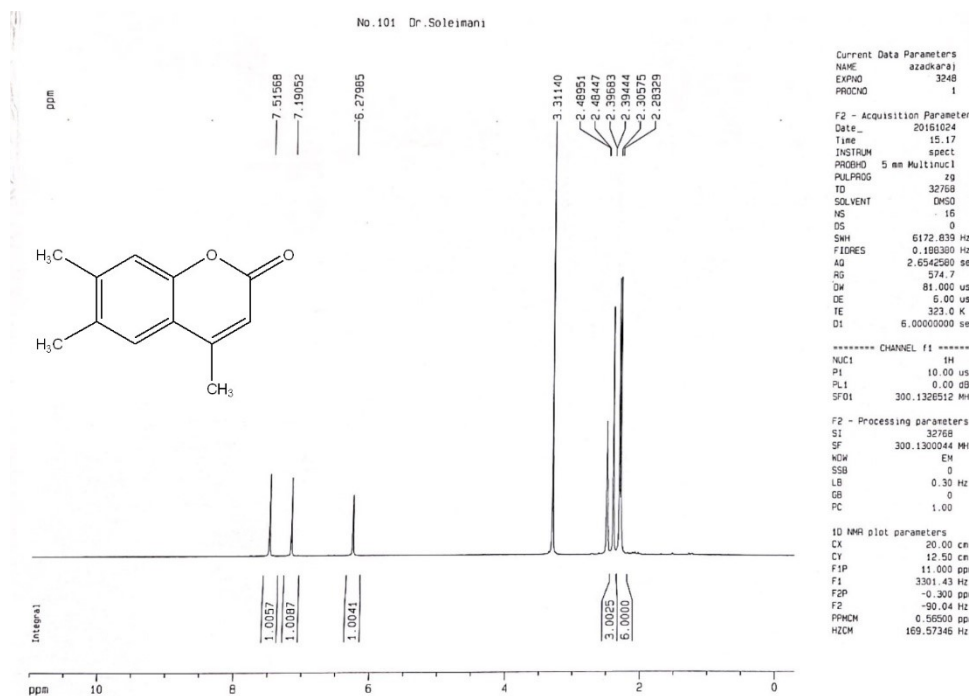
¹³C NMR of 8-Hydroxy-4-methylcoumarin (**3b**)



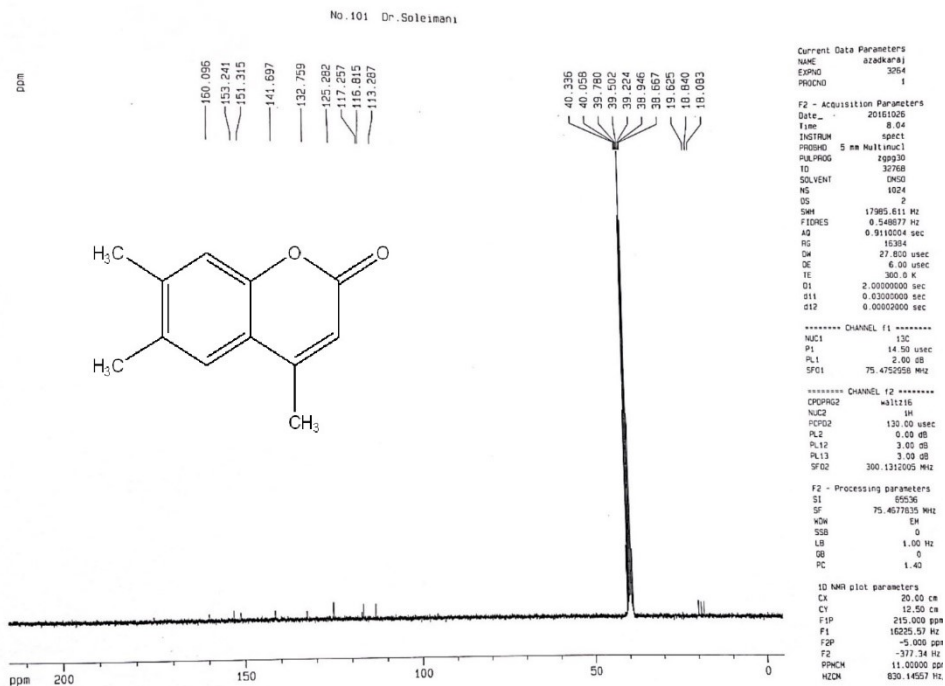
¹H NMR of 4,7-dimethylcoumarin (**3g**)



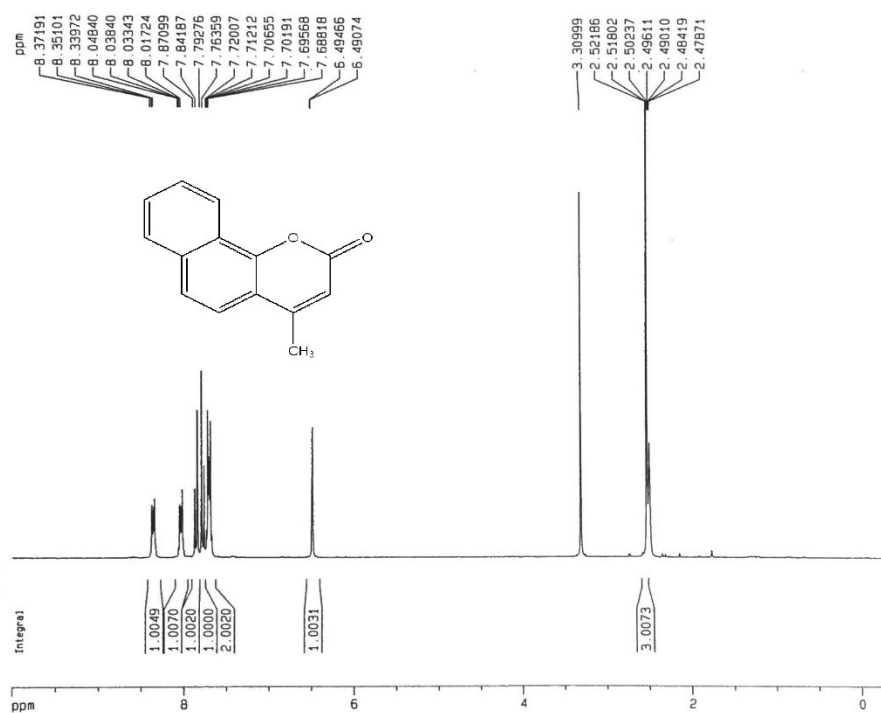
¹³C NMR of 4,7-dimethylcoumarin (**3g**)



¹H NMR of 4,6,7-trimethylcoumarin (**3h**)



¹³C NMR of 4,6,7-trimethylcoumarin (**3h**)



Current Data Parameters
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 EXPNO 3107
 PROCNO 1

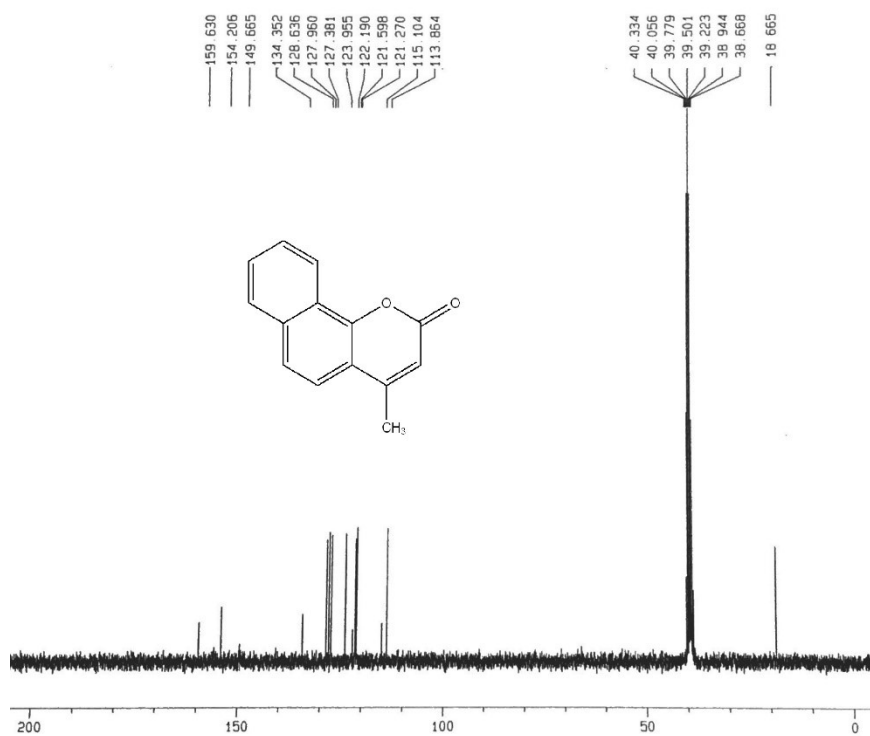
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 DW 81.000 usec
 DE 6.00 usec
 TE 323.0 K
 D1 6.0000000 sec

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F2 - Processing parameters
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 WDM EM
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 LB 0.30 Hz
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 PC 1.00

1D NMR plot parameters
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 CY 12.50 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.300 ppm
 F2 -90.04 Hz
 PPMCM 0.51500 ppm/cm
 HZCM 154.56694 Hz/cm

¹H NMR of 4-methyl-2H-benzo[h]coumarin (3i)



Current Data Parameters
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 EXPNO 3113
 PROCNO 1

F2 - Acquisition Parameters
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 TD 32768
 SOLVENT DMSO
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 DS 0
 SWH 17985.511 Hz
 FIDRES 0.548877 Hz
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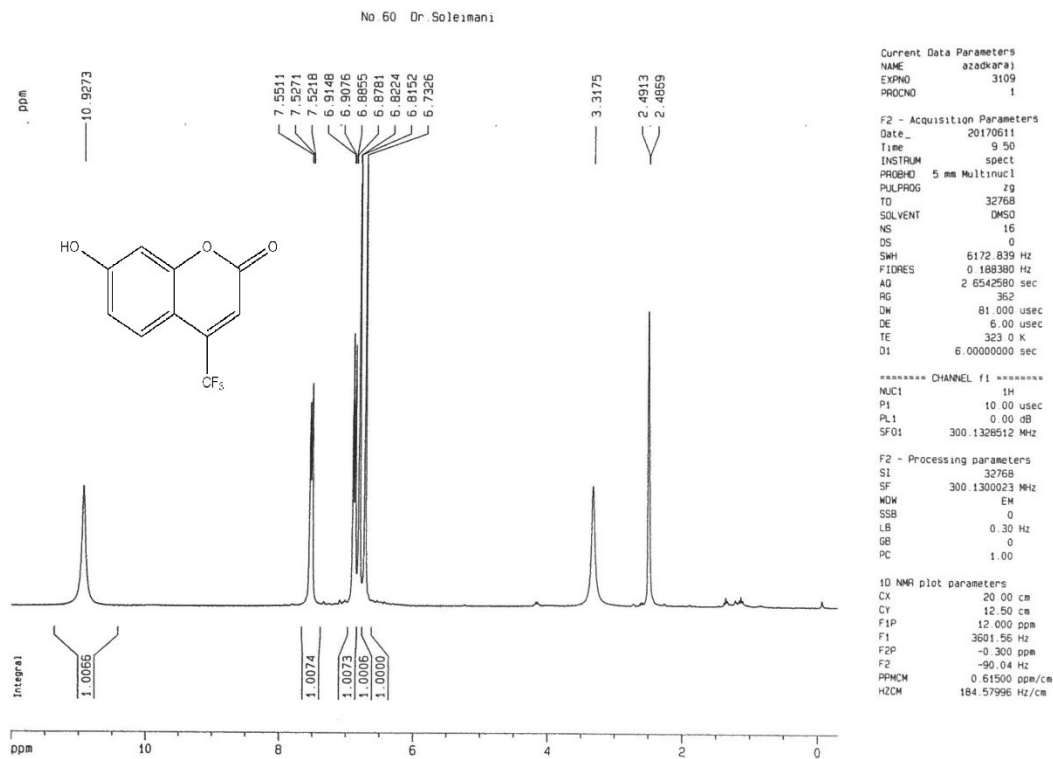
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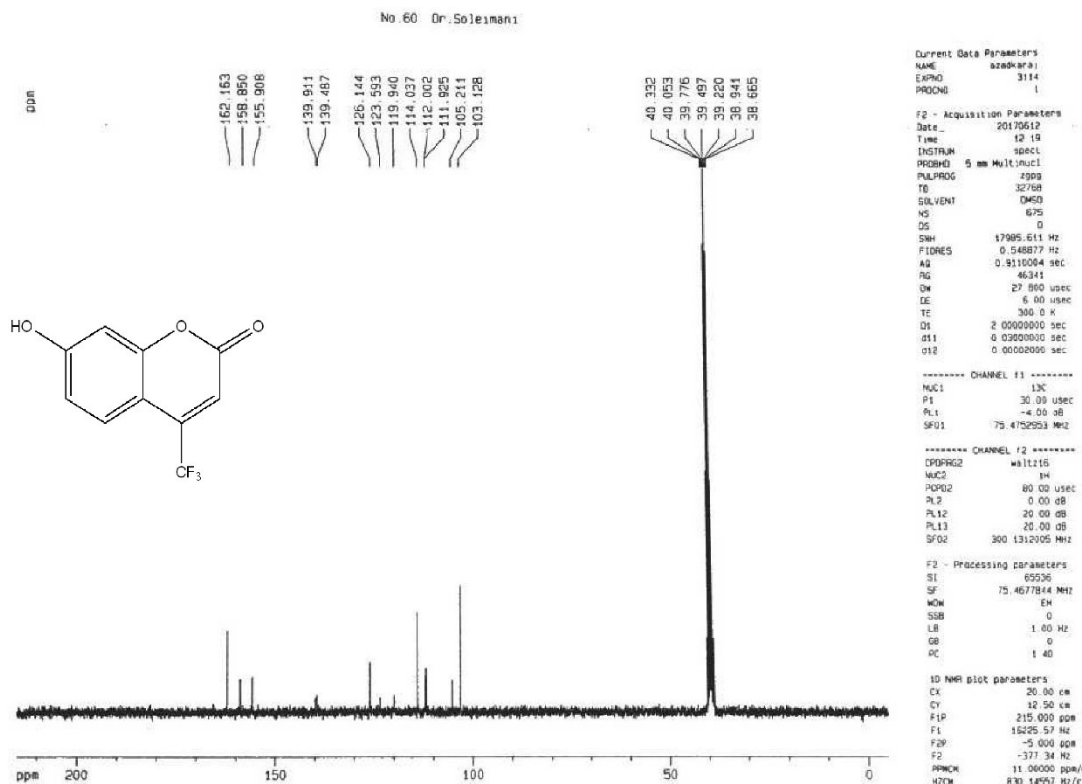
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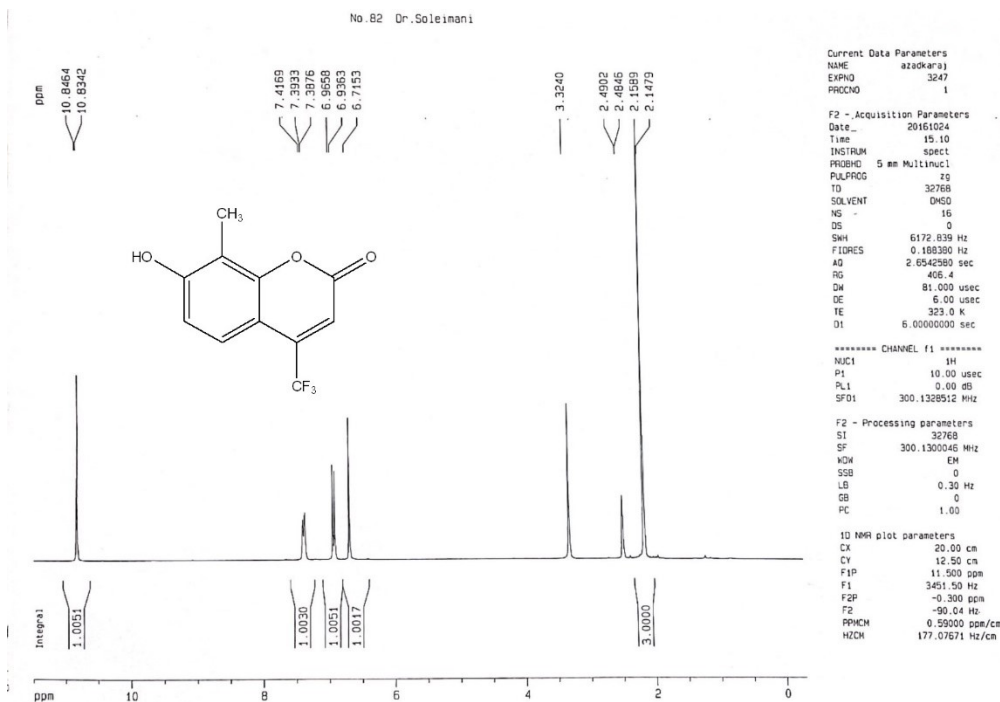
¹³C NMR of 4-methyl-2H-benzo[h]coumarin (3i)



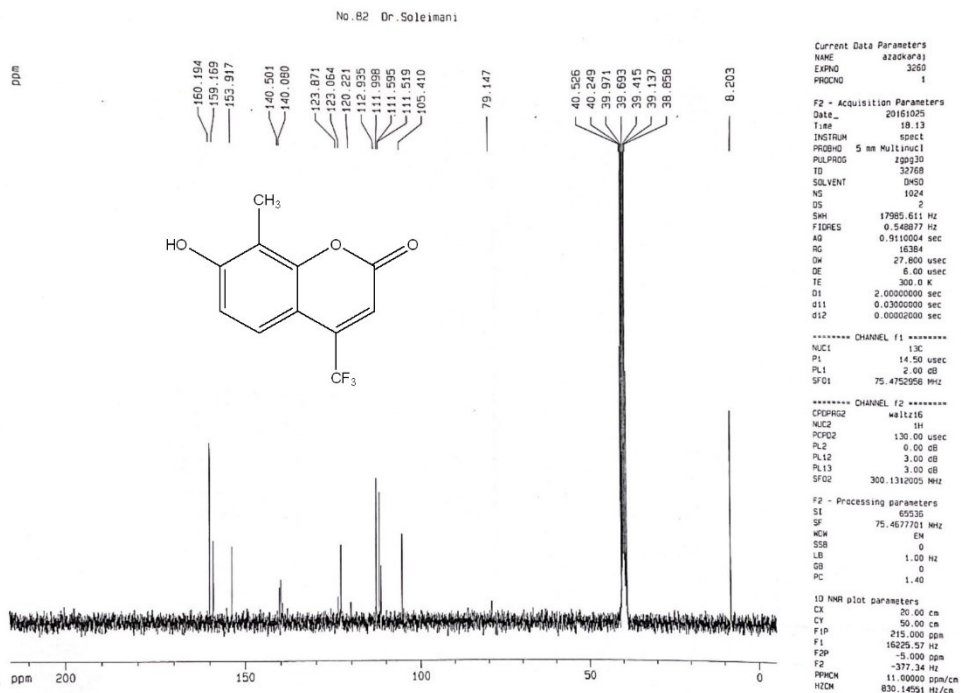
¹H NMR of 7-hydroxy-4-(trifluoromethyl)coumarin (3j)



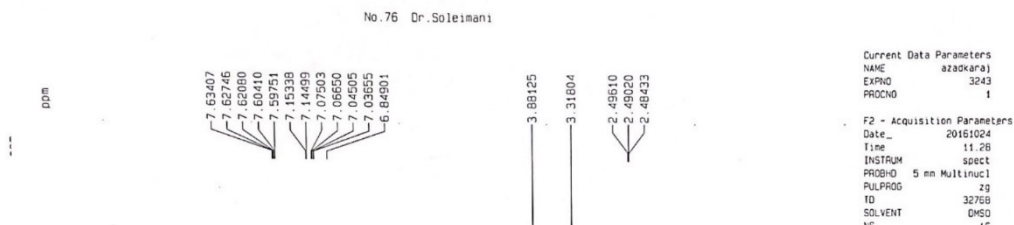
¹³C NMR of 7-hydroxy-4-(trifluoromethyl)coumarin (**3j**)



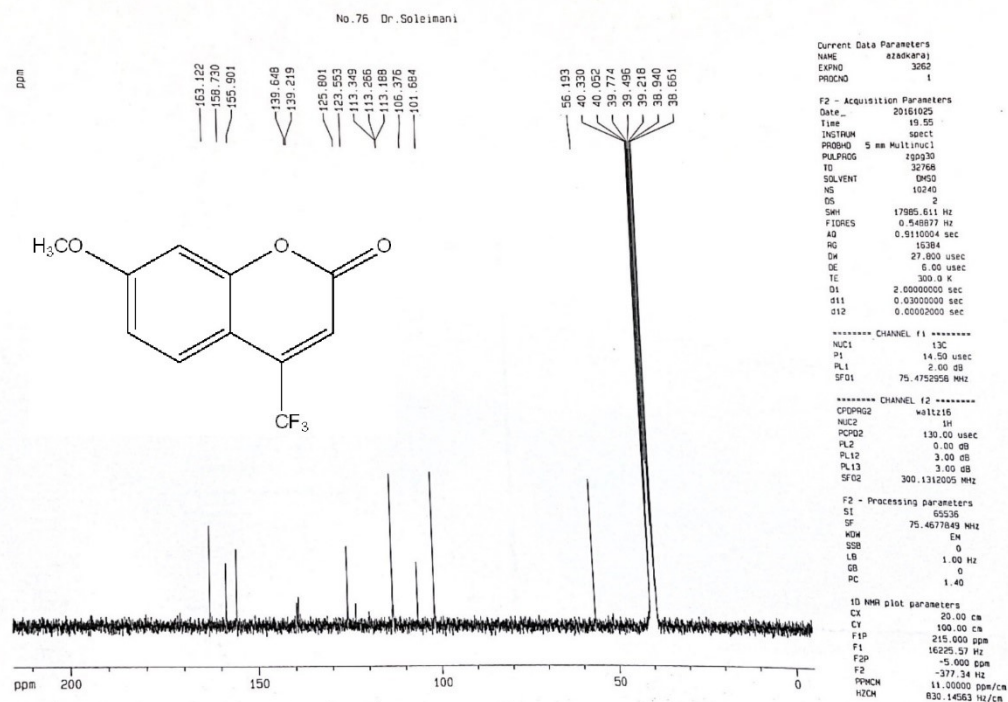
¹H NMR of 7-hydroxy-8-methyl-4-(trifluoromethyl)coumarin (**3m**)



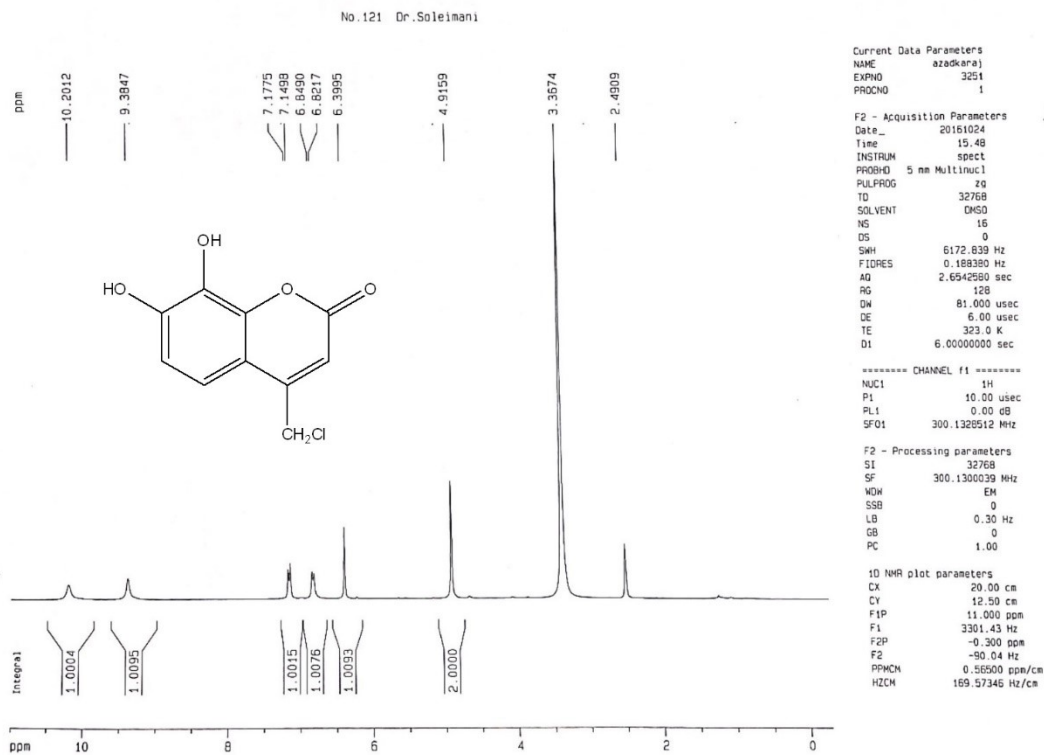
¹³C NMR of 7-hydroxy-8-methyl-4-(trifluoromethyl)coumarin (**3m**)



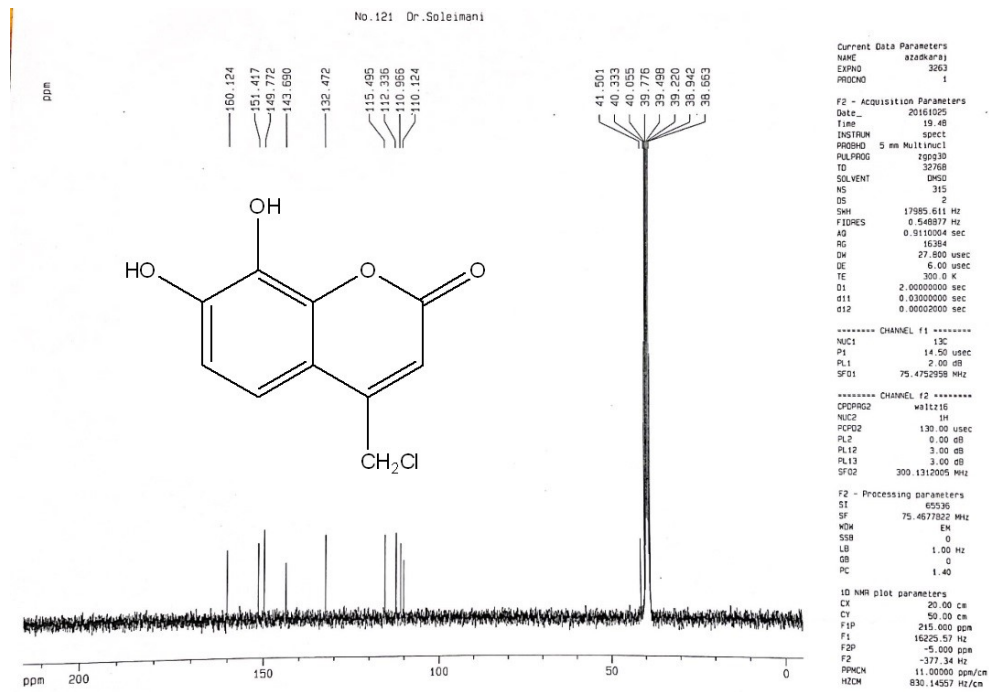
¹H NMR of 7-methoxy-4-(trifluoromethyl)coumarin (**3n**)



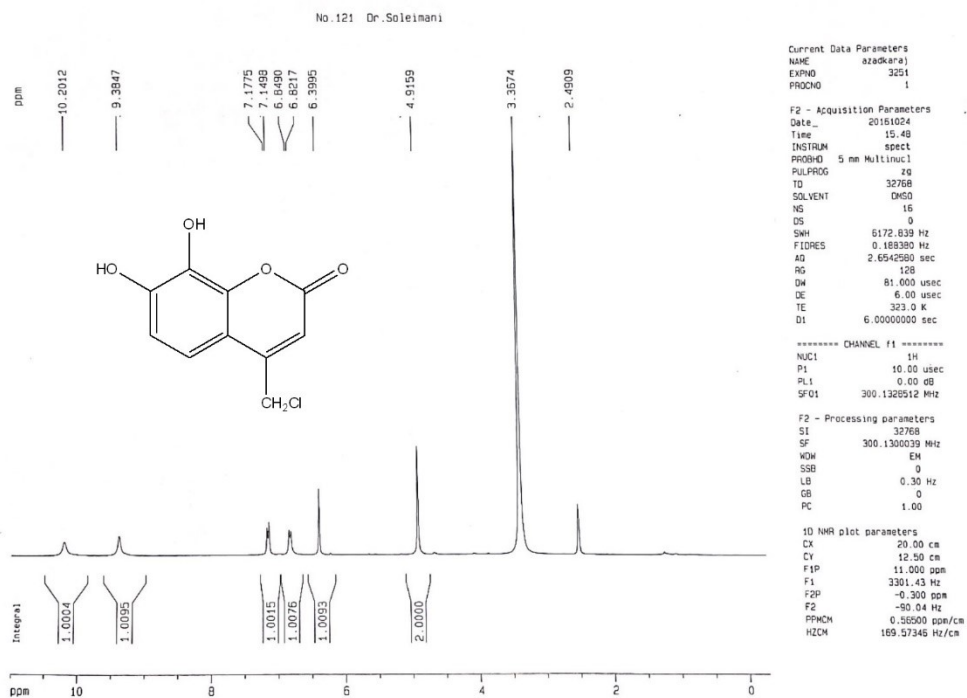
¹³C NMR of 7-methoxy-4-(trifluoromethyl)coumarin (**3n**)



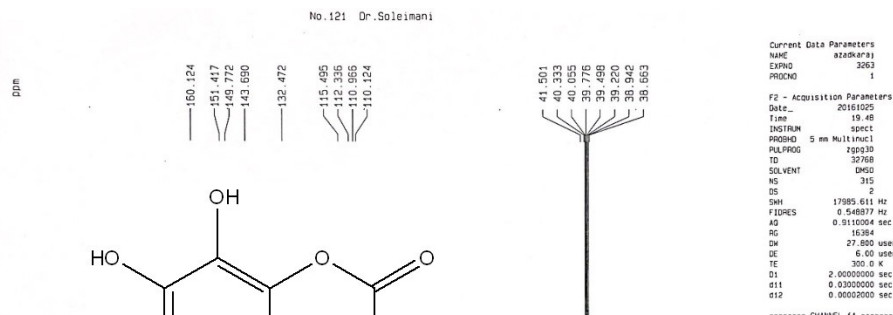
¹H NMR of 4-(chloromethyl)-7,8-dihydroxycoumarin (**3q**)



¹³C NMR of 4-(chloromethyl)-7,8-dihydroxycoumarin (3q)



¹H NMR of 4-(chloromethyl)-5,7-dihydroxycoumarin (3r)



^{13}C NMR of 4-(chloromethyl)-5,7-dihydroxycoumarin (**3r**)

Figure S1. ^1H and ^{13}C NMR spectra of some synthesized coumarins.