## Nano $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>-supported fluoroboric acid: a novel magnetically recyclable catalyst for the synthesis of 12-substituted-benzo[*h*] [1,3]dioxolo[4,5-*b*] acridine-10,11-diones as potent antitumor agents

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## Content

Copy of <sup>1</sup>H NMR <sup>13</sup>C NMR and IR------2-30

1H solvent:DMSO No:4a 2013.11.16



Figure 1. <sup>1</sup>H NMR of 4a



Figure 2. <sup>13</sup>C NMR of 4a







Figure 4. <sup>1</sup>H NMR of 4b



Figure 5. <sup>13</sup>C NMR of **4b** 



Figure 6. IR of 4b



Figure 8. <sup>13</sup>C NMR of 4c







Figure 10. <sup>1</sup>H NMR of 4d





Figure 12. IR of 4d







Figure 14. <sup>13</sup>C NMR of **4e** 

ppm (t1)







Figure 16. <sup>1</sup>H NMR of 4f



Figure 17.<sup>13</sup>C NMR of 4f



Figure 18. IR of 4f









Figure 20. <sup>13</sup>C NMR of **4g** 







Figure 22. <sup>1</sup>H NMR of 4h



Figure 24. IR of 4h



![](_page_13_Figure_1.jpeg)

![](_page_13_Figure_2.jpeg)

Figure 26. <sup>13</sup>C NMR of **4i** 

![](_page_14_Figure_1.jpeg)

![](_page_14_Figure_2.jpeg)

![](_page_14_Figure_3.jpeg)

![](_page_14_Figure_4.jpeg)

![](_page_15_Figure_0.jpeg)

![](_page_15_Figure_1.jpeg)

35 30 25 4000 Figure 30. IR of 4j

Wavenumbers (cm-1)

**Mransni**t

![](_page_16_Figure_0.jpeg)

Figure 32. <sup>13</sup>C NMR of **4**k

![](_page_17_Figure_0.jpeg)

Figure 33. IR of 4k

![](_page_17_Figure_2.jpeg)

Figure 34. <sup>1</sup>H NMR of 41

![](_page_18_Figure_0.jpeg)

Figure 35. <sup>13</sup>C NMR of **4** 

![](_page_18_Figure_2.jpeg)

Figure 36. IR of 41

![](_page_19_Figure_0.jpeg)

![](_page_19_Figure_1.jpeg)

Figure 37. <sup>1</sup>H NMR of 4m

![](_page_19_Figure_3.jpeg)

Figure 38. <sup>13</sup>C NMR of **4m** 

![](_page_20_Figure_0.jpeg)

Figure 39. IR of 4m

![](_page_20_Figure_2.jpeg)

Figure 40. <sup>1</sup>H NMR of 4n

![](_page_21_Figure_0.jpeg)

Figure 42. IR of 4n

![](_page_22_Figure_0.jpeg)

Figure 43. <sup>1</sup>H NMR of 40

![](_page_22_Figure_2.jpeg)

Figure 44. <sup>13</sup>C NMR of **40** 

![](_page_23_Figure_0.jpeg)

![](_page_23_Figure_1.jpeg)

![](_page_23_Figure_2.jpeg)

Figure 46. <sup>1</sup>H NMR of 4p

![](_page_24_Figure_0.jpeg)

Wavenumbers (cm-1)

Figure 48. IR of 4p

![](_page_25_Figure_0.jpeg)

![](_page_25_Figure_1.jpeg)

![](_page_25_Figure_2.jpeg)

Figure 50. <sup>13</sup>C NMR of **4q** 

![](_page_26_Figure_0.jpeg)

Figure 51. IR of 4q

![](_page_27_Figure_0.jpeg)

![](_page_27_Figure_1.jpeg)

![](_page_27_Figure_2.jpeg)

Figure 53. <sup>13</sup>C NMR of **4r** 

![](_page_28_Figure_0.jpeg)

Figure 54. IR of 4r

![](_page_28_Figure_2.jpeg)

Figure 55. <sup>1</sup>H NMR of 5

![](_page_29_Figure_0.jpeg)

Figure 56. <sup>13</sup>C NMR of **5** 

![](_page_29_Figure_2.jpeg)

Figure 57. IR of 5