An efficient green protocol for the synthesis of tetra-substituted imidazoles catalyzed by zeolite BEA: Effect of surface acidity and polarity of zeolite

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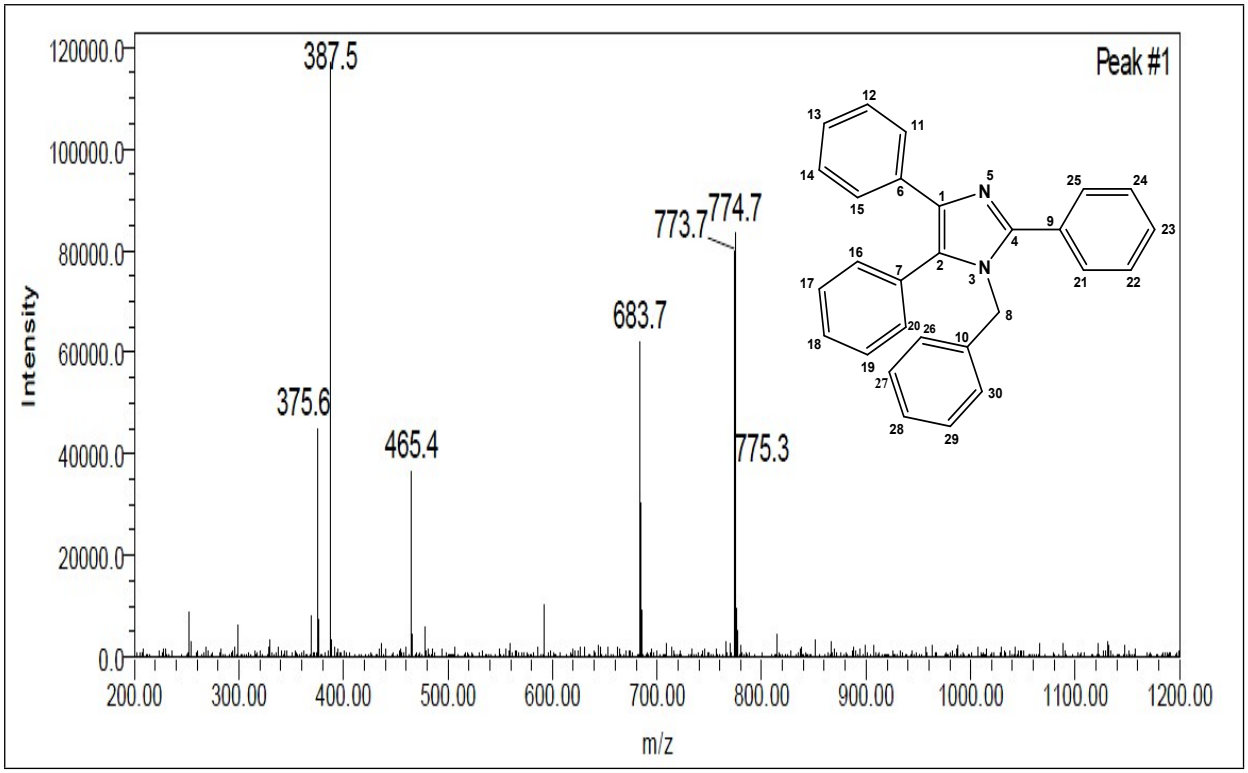


Fig. 1.1. Mass spectrum of 1-benzyl-2,4,5-triphenyl-1*H*-imidazole (5a, n = 1)

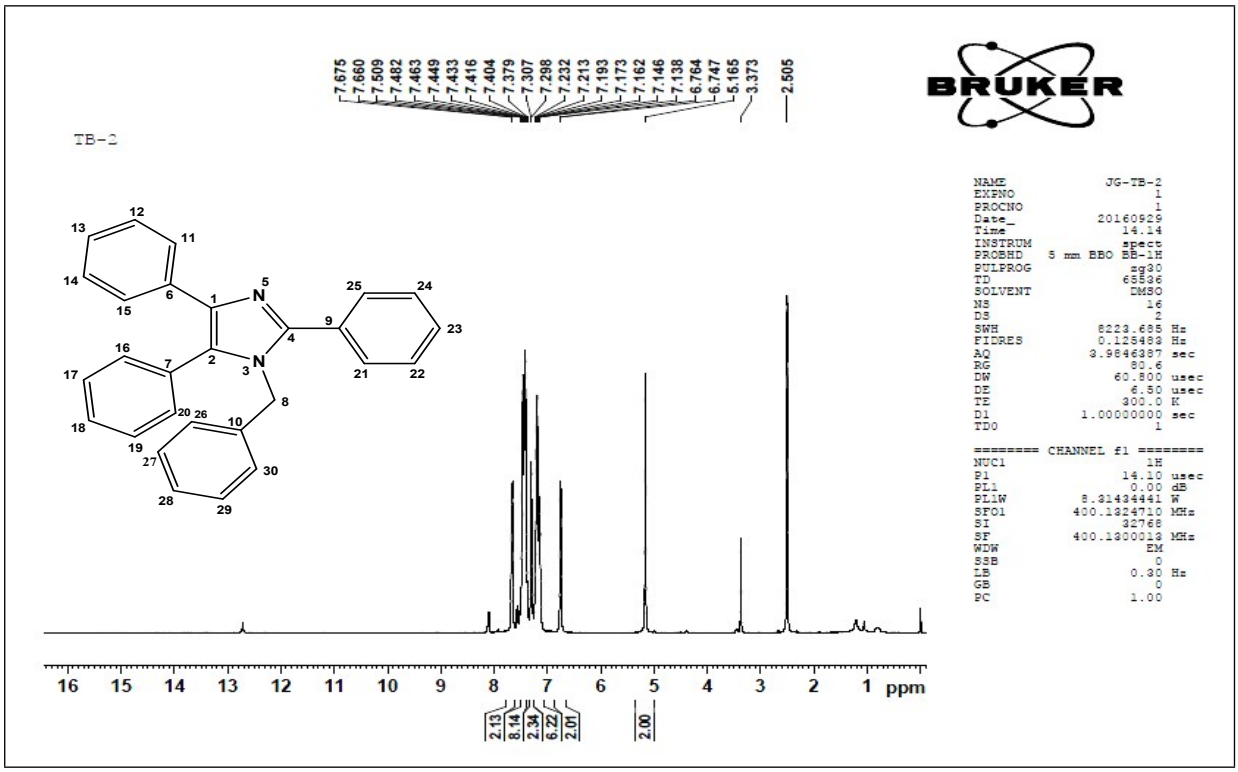


Fig. 1.2. [1]H NMR spectrum of 1-benzyl-2,4,5-triphenyl-1*H*-imidazole (5a, n = 1)

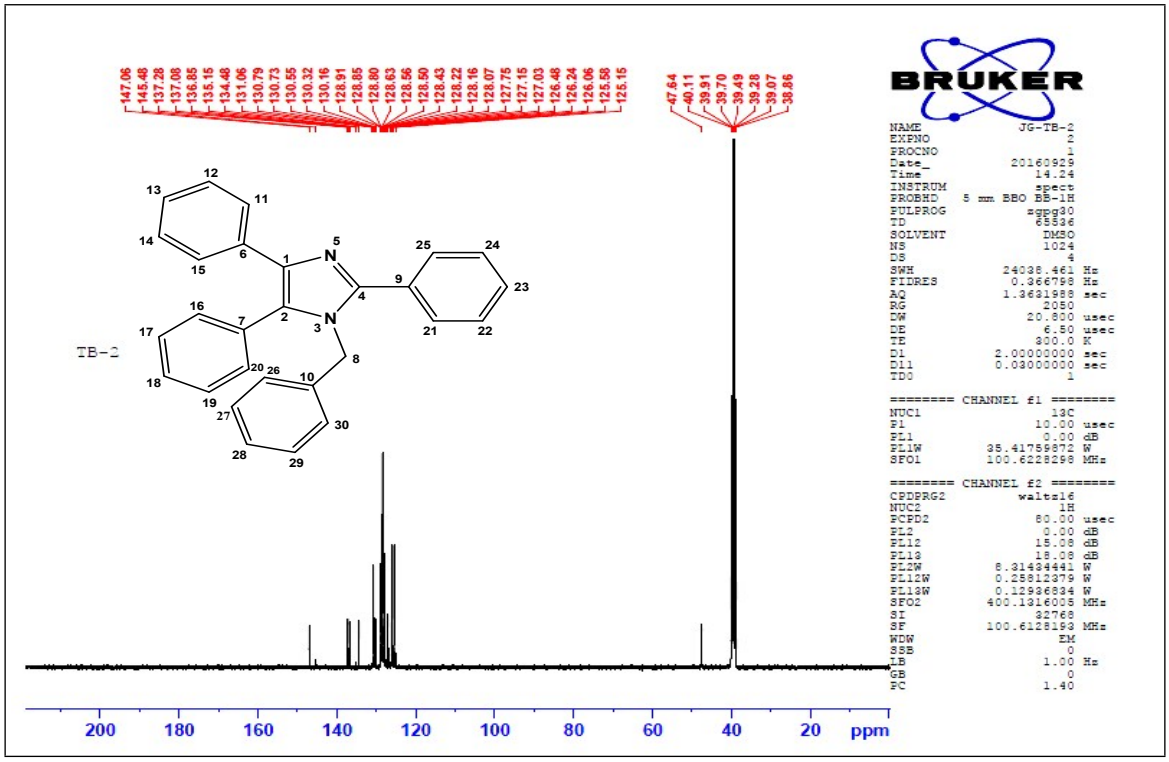


Fig. 1.3. ^{13}C NMR spectrum of 1-benzyl-2,4,5-triphenyl-1*H*-imidazole (5a, n = 1)

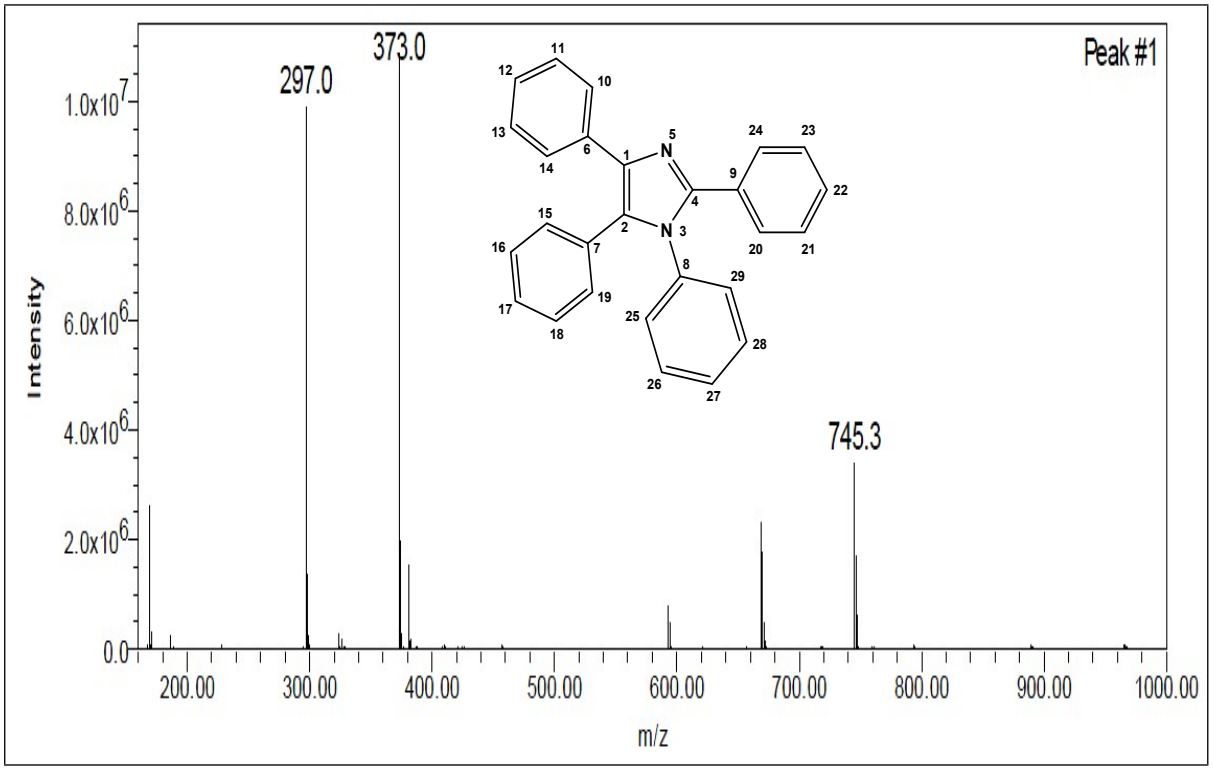


Fig 2.1. Mass spectrum of 1,2,4,5-tetraphenyl-1*H*-imidazole (5a, n = 0)

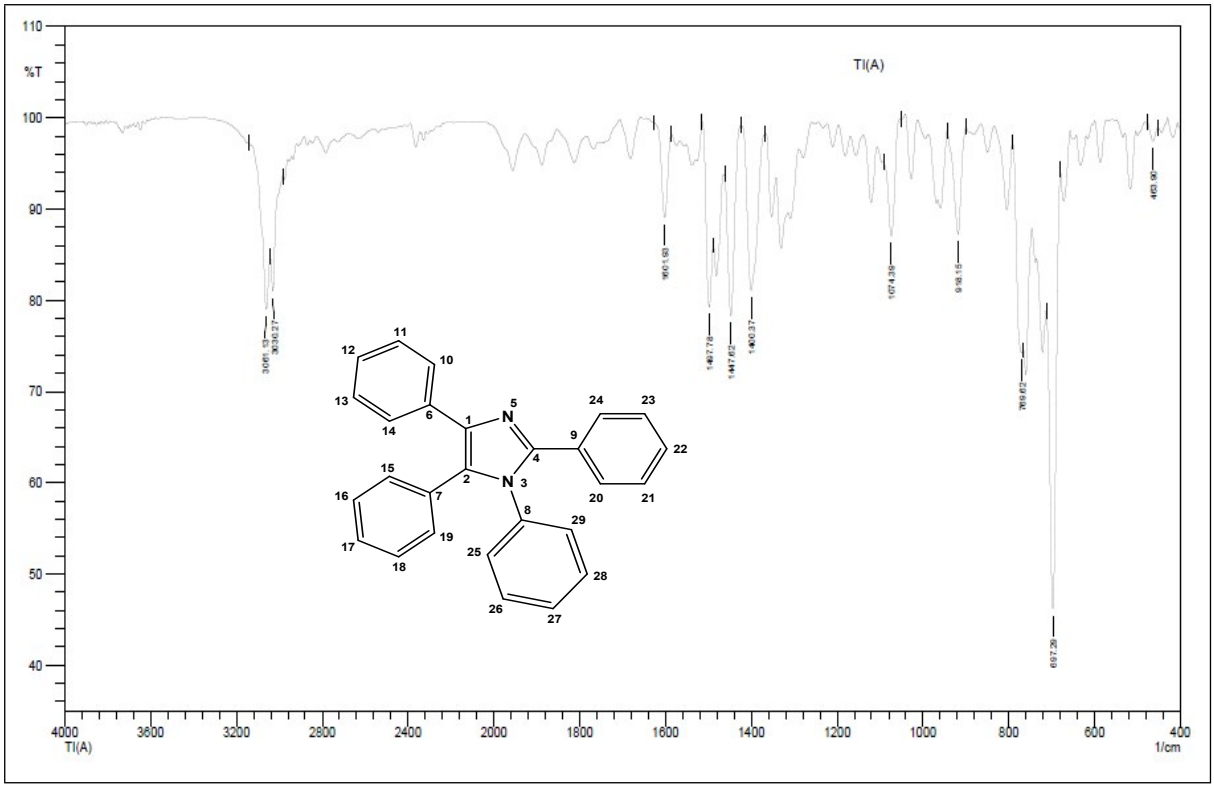


Fig. 2.2. IR spectrum of 1,2,4,5-tetraphenyl-1H-imidazole (5a, n = 0)

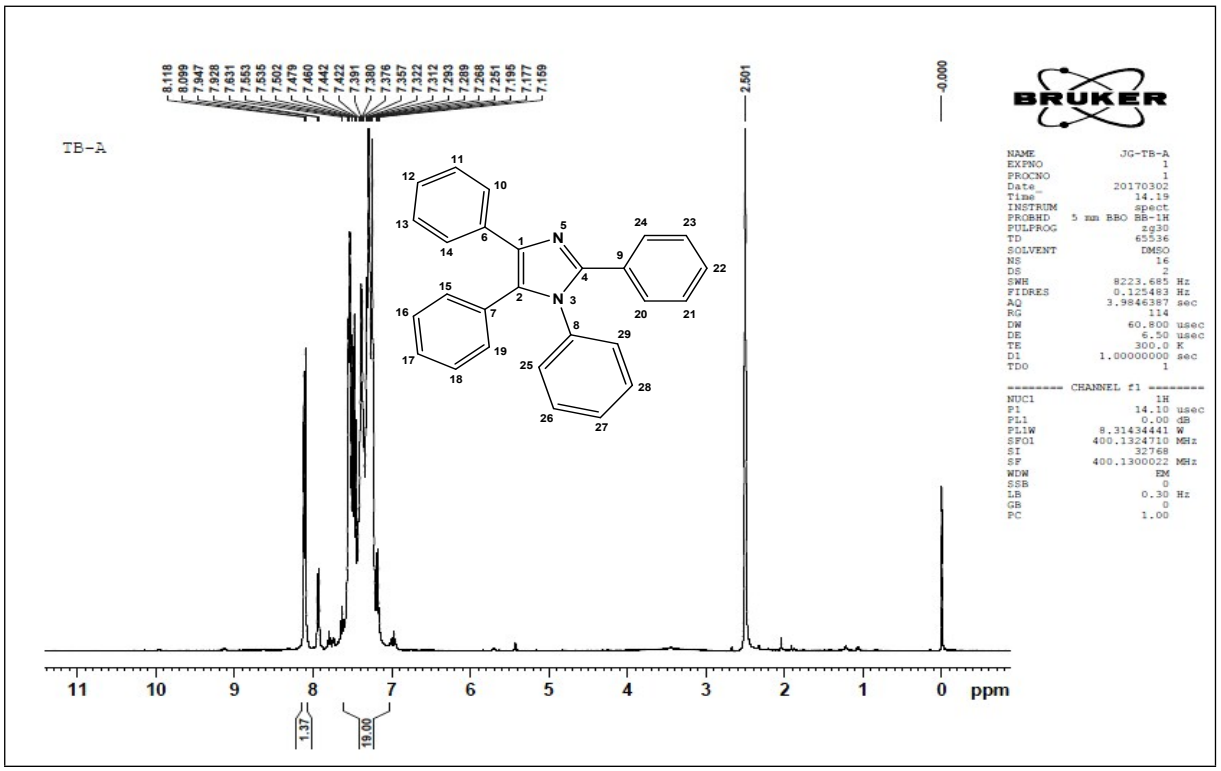


Fig. 2.3. ^{1}H NMR spectrum of 1,2,4,5-tetraphenyl-1*H*-imidazole (5a, n = 0)

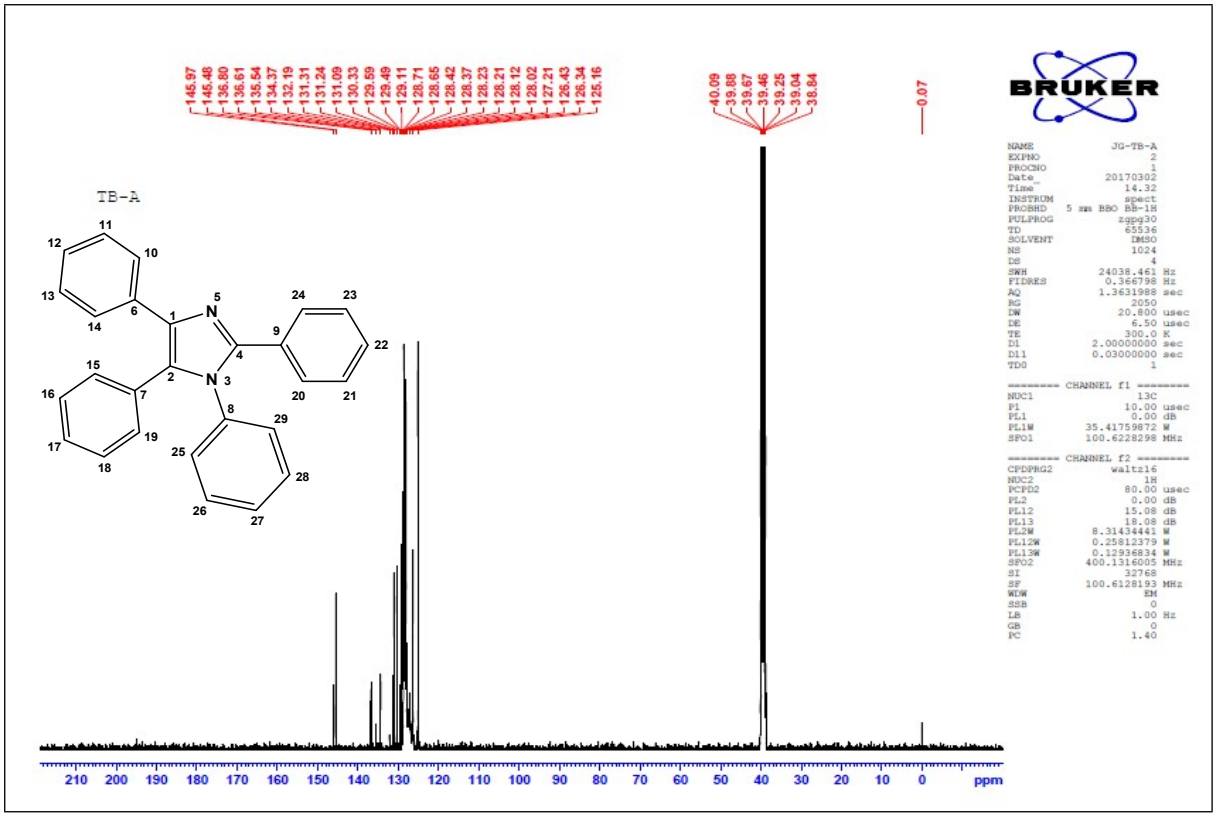
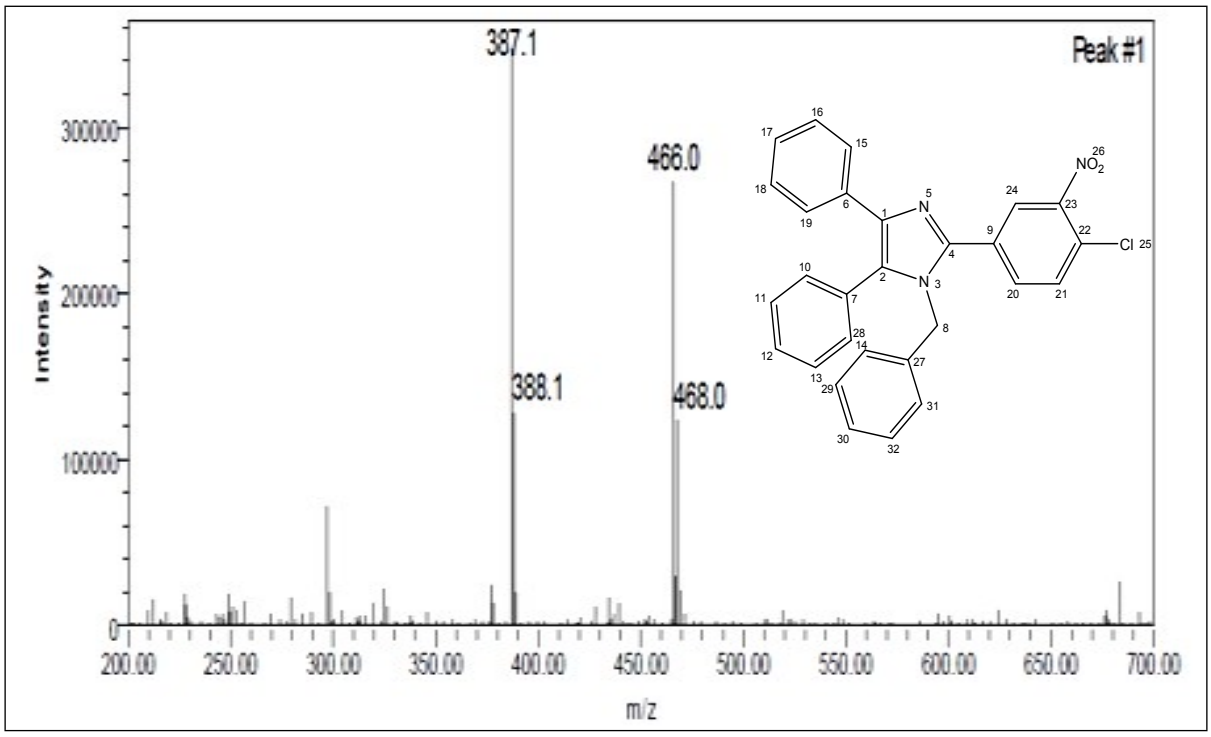


Fig. 2.4. ^{13}C NMR spectrum of 1,2,4,5-tetraphenyl-1*H*-imidazole (5a, n = 0)



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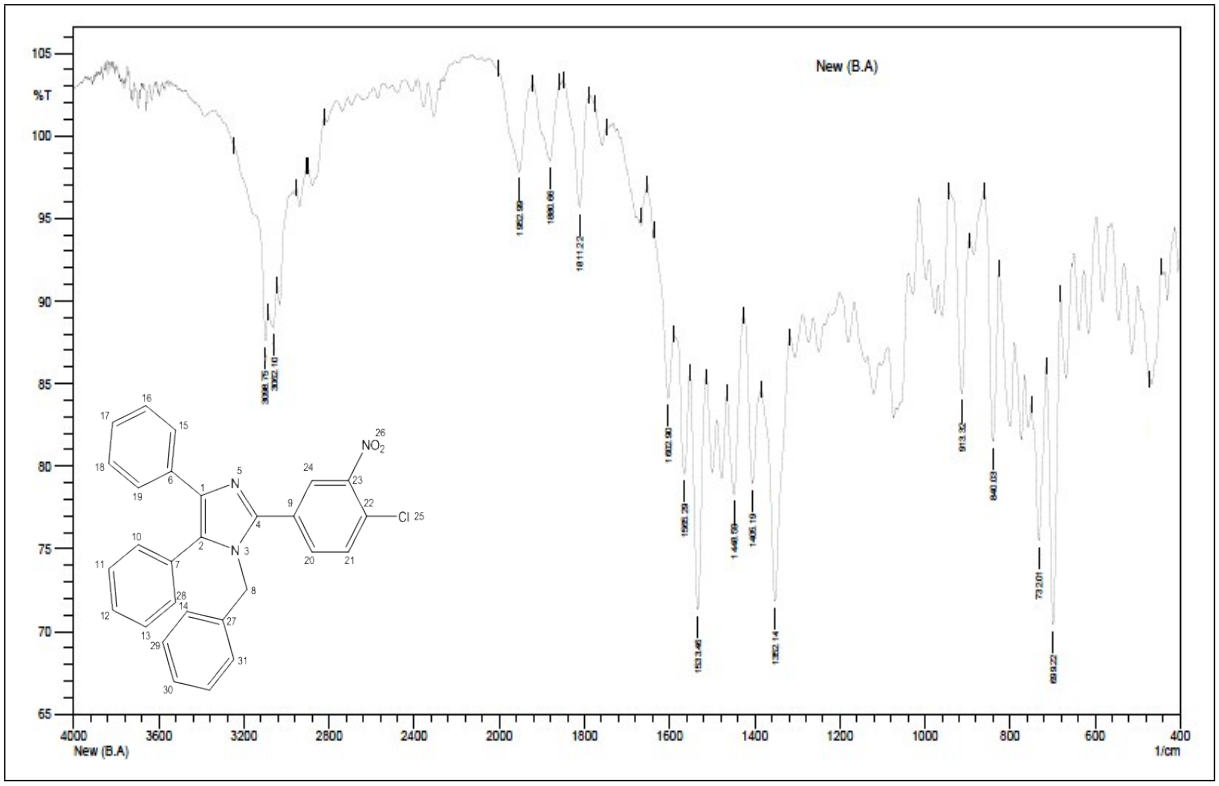

Fig. 3.2. IR spectrum of 1-benzyl-2-(4-chloro-3-nitrophenyl)-4,5-diphenyl-1*H*-imidazole (5h, n = 1)

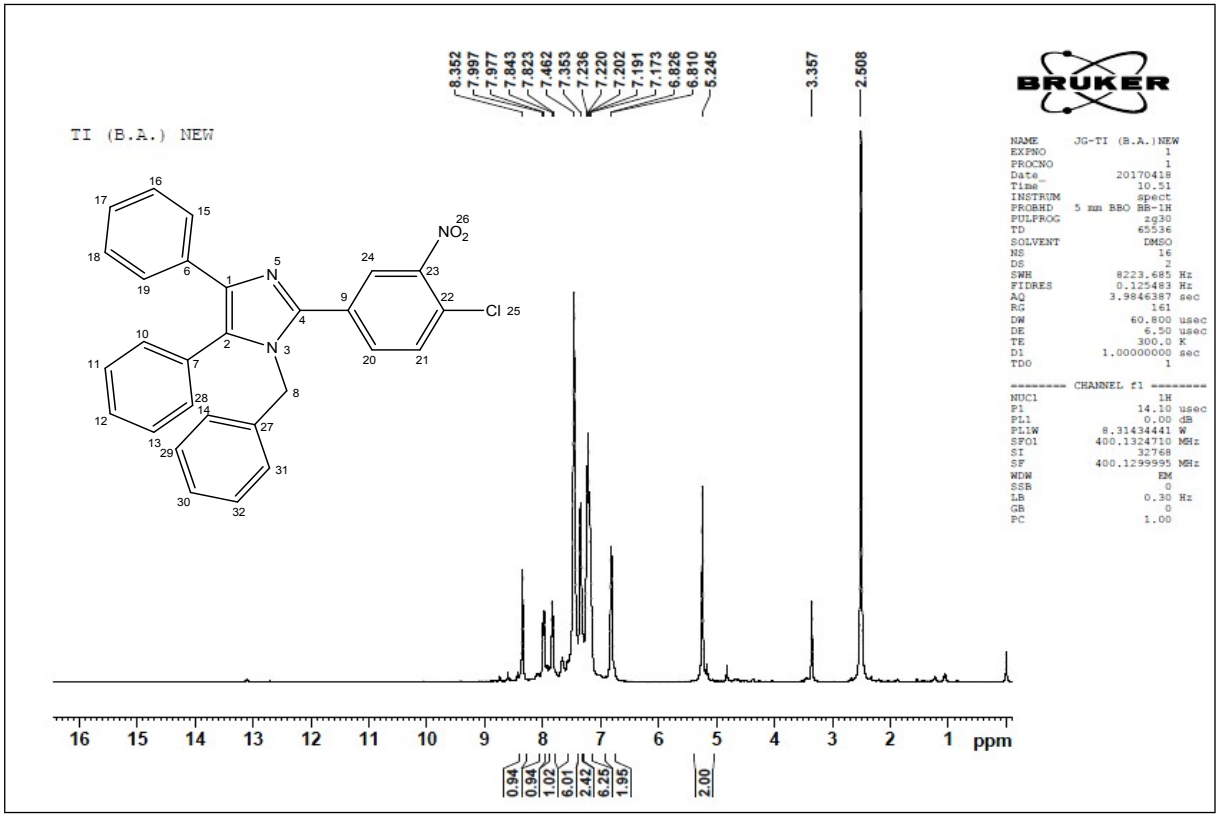

Fig. 3.3. ^{1}H NMR spectrum of 1-benzyl-2-(4-chloro-3-nitrophenyl)-4,5-diphenyl-1*H*-imidazole (5h, n = 1)

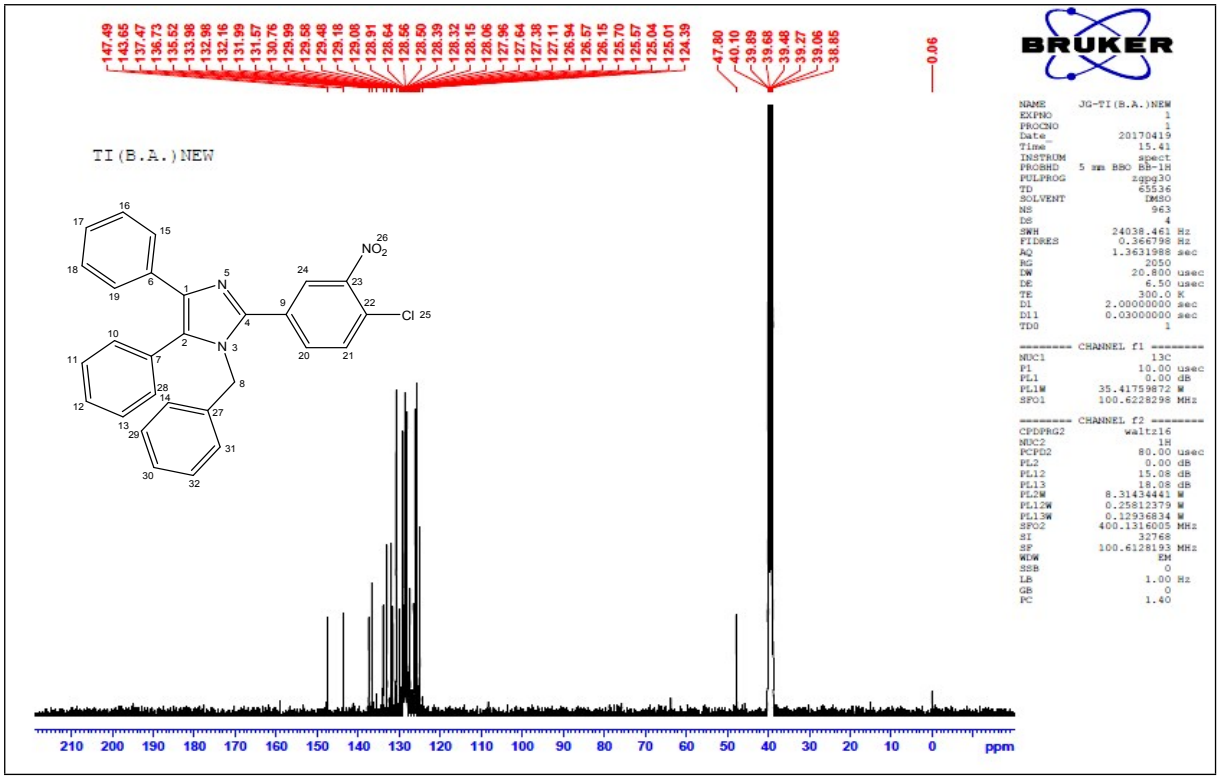

Fig. 3.4. ^{13}C NMR spectrum of 1-benzyl-2-(4-chloro-3-nitrophenyl)-4,5-diphenyl-1*H*-imidazole (5h, n = 1)

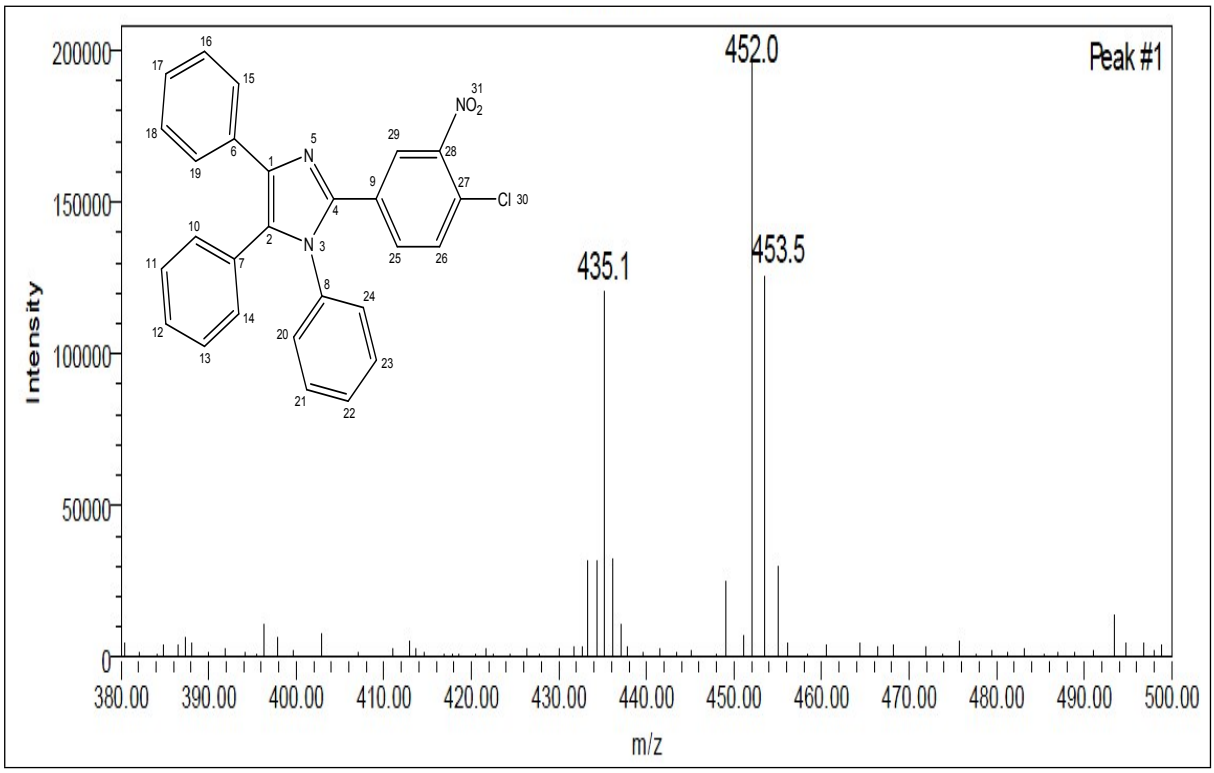

Fig. 4.1. Mass spectrum of 2-(4-chloro-3-nitrophenyl)-1,4,5-triphenyl-1*H*-imidazole (5h, n = 0)

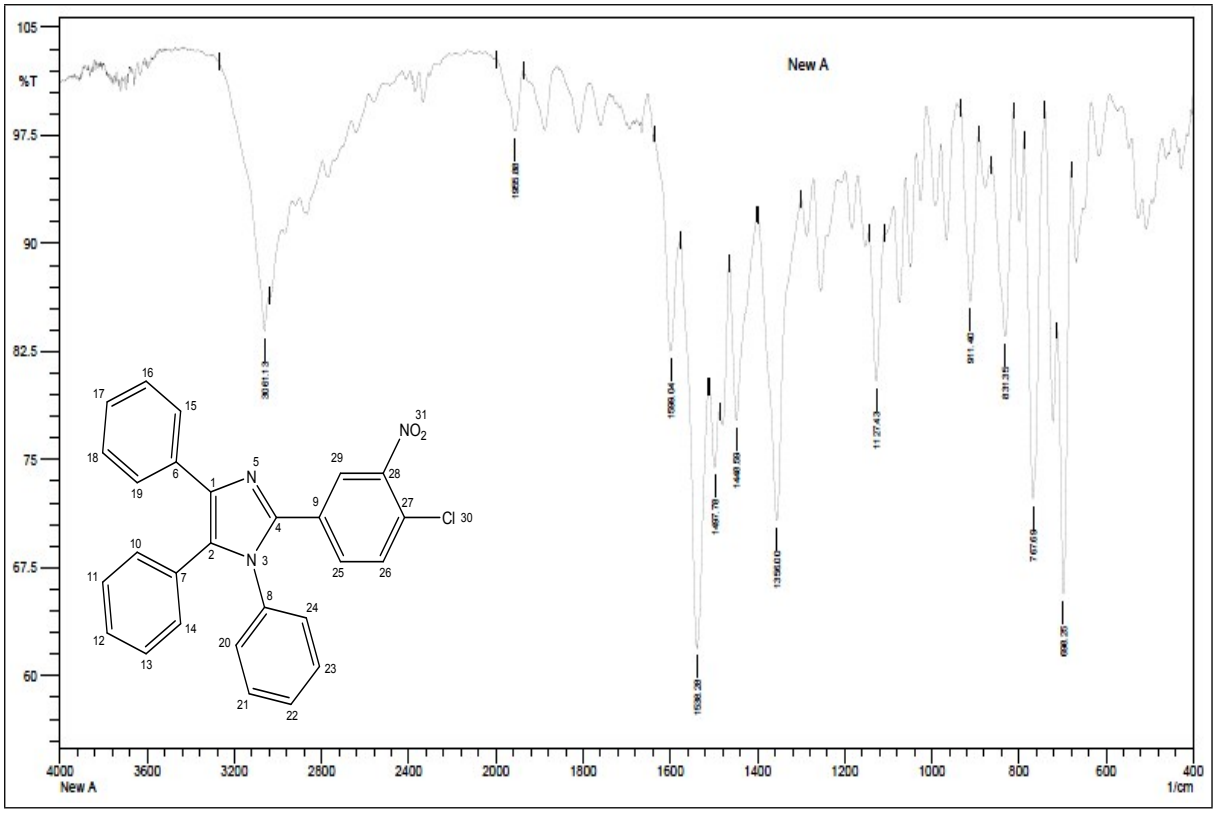

Fig. 4.2. IR spectrum of 2-(4-chloro-3-nitrophenyl)-1,4,5-triphenyl-1*H*-imidazole (5h, n = 0)

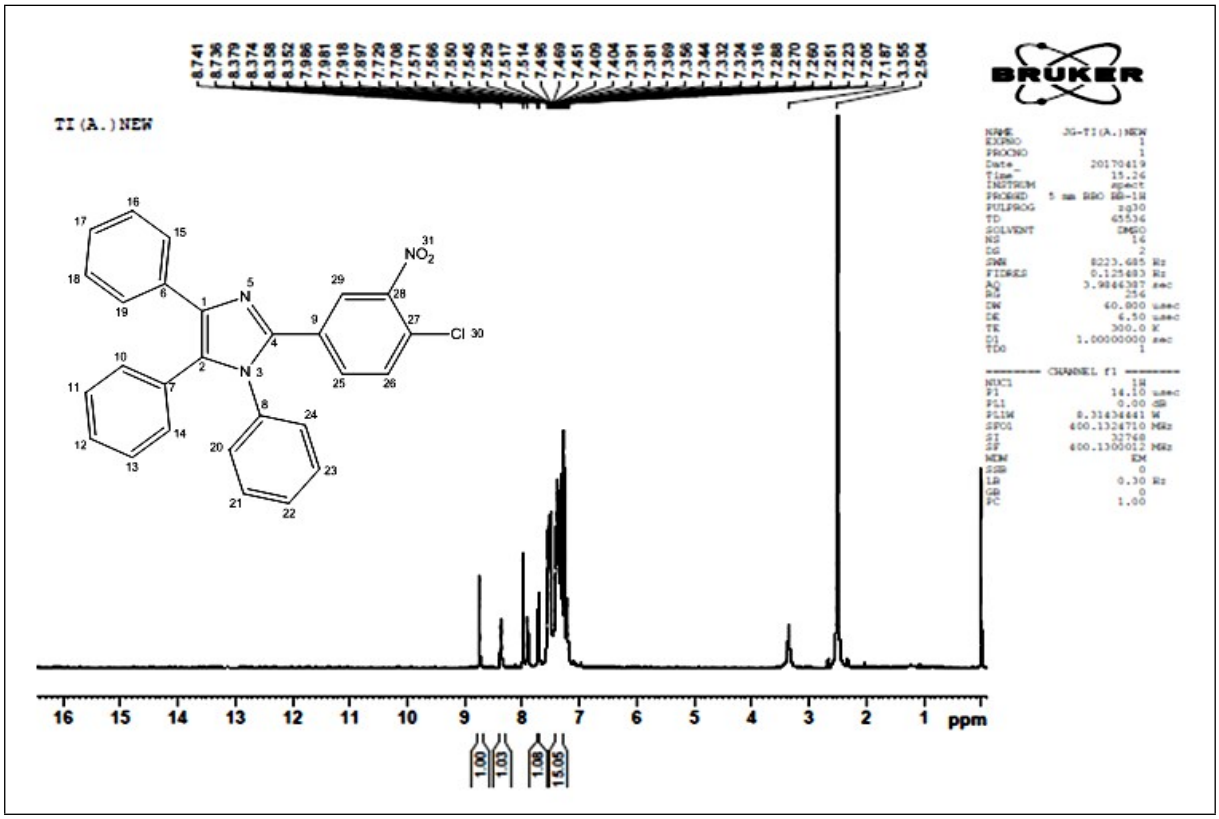

Fig. 4.3. [1]H NMR spectrum of 2-(4-chloro-3-nitrophenyl)-1,4,5-triphenyl-1*H*-imidazole (5h, n = 0)

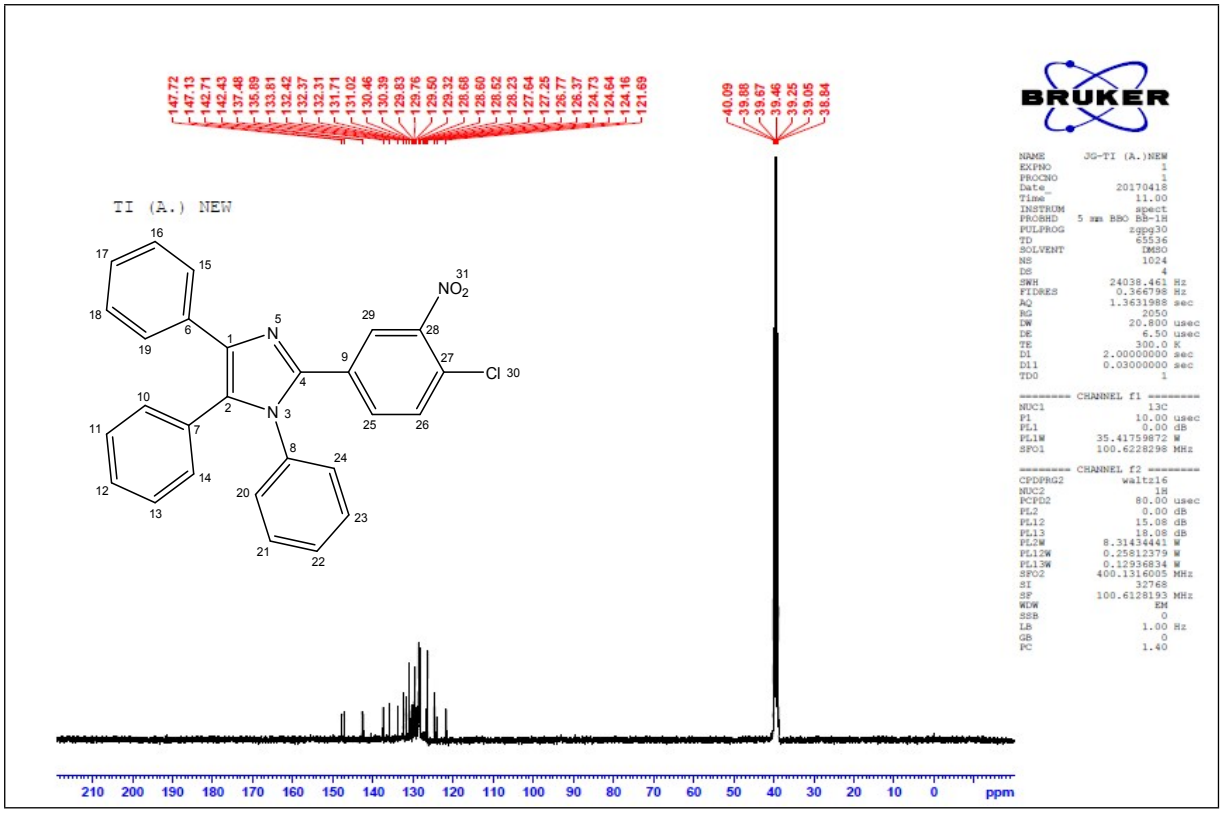

Fig. 4.4. ^{13}C NMR spectrum of 2-(4-chloro-3-nitrophenyl)-1,4,5-triphenyl-1*H*-imidazole (5h, n = 0)