

Supplementary Information

Nano silica sulfuric acid catalyzed facile synthesis of azothiadiazoles under co-grinding and solvent-free technique

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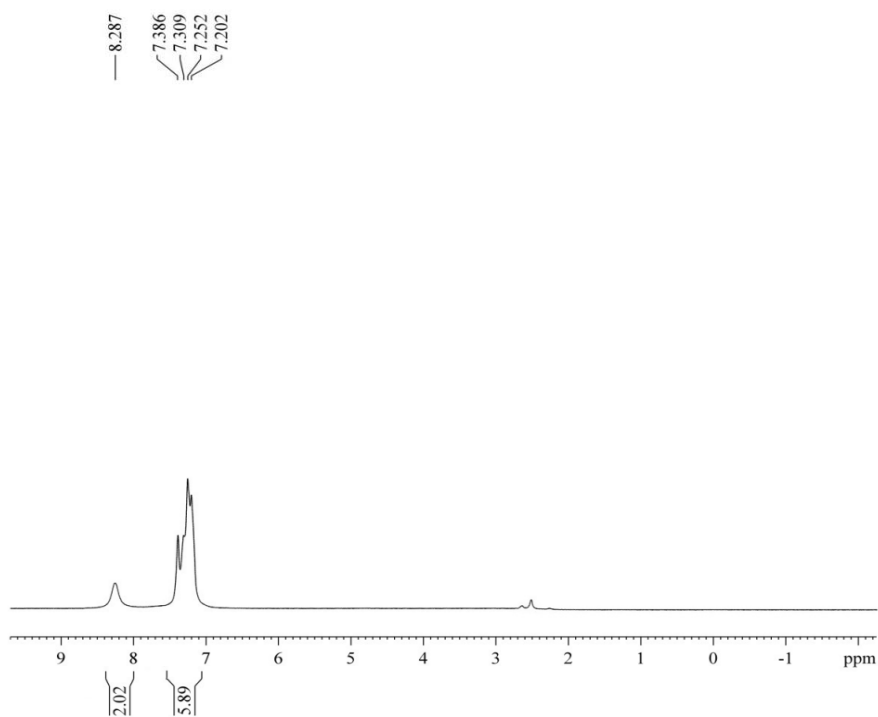
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Supplementary spectral Data

- 1) ¹H NMR of 2-Amino-5-phenylazo-thiazole (**3a**).....(S1)
- 2) ¹H NMR of 2-Amino-5 (4-chloro phenyl) azo thiazole (**3b**).....(S2)
- 3) ¹H NMR of 2-amino-5-(4-acetylphenylazo)-thiazole (**3e**).....(S3)
- 4) ¹H NMR of 2-amino-5-(4-anisylazo)-4-phenylthiazole (**3g**)(S4)
- 5) ¹H NMR of 2-amino-5-(4-nitrophenylazo)-4-phenylthiazole (**3i**).....(S5)
- 6) ¹H NMR of 2-Amino-4-methyl-5-(4-nitrophenylazo)thiazole (**3k**).....(S6)
- 7) ¹H NMR of 2-Amino-5-(4-anisylazo)-4-methylthiazole (**3l**).....(S7)

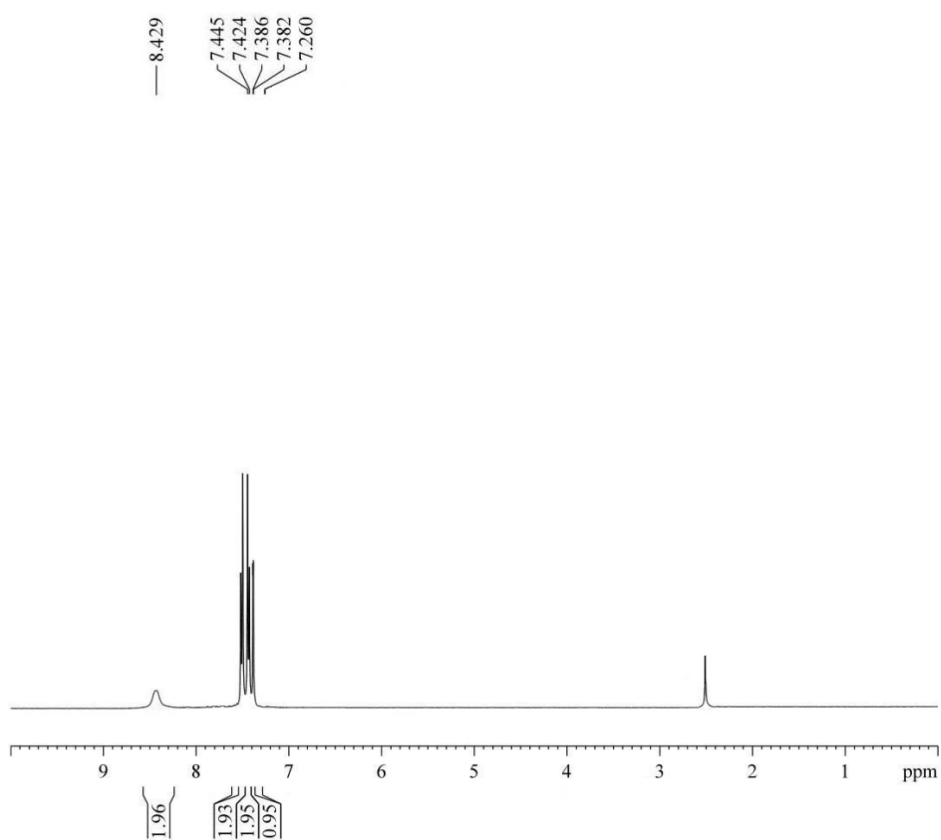


(S1) ^1H NMR of 2-Amino-5-phenylazo-thiazole (**3a**)



NAME Feb20-2018
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 SOLVENT DMSO
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9923444 sec
 RG 144
 DW 60.800 usec
 DE 6.50 usec
 TE 298.2 K
 D1 1.00000000 sec
 TD0 1

CHANNEL f1
 NUC1 1H
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 PL1 -3.00 dB
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 SFO1 400.2224715 MHz
 SI 16384
 SF 400.2200000 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

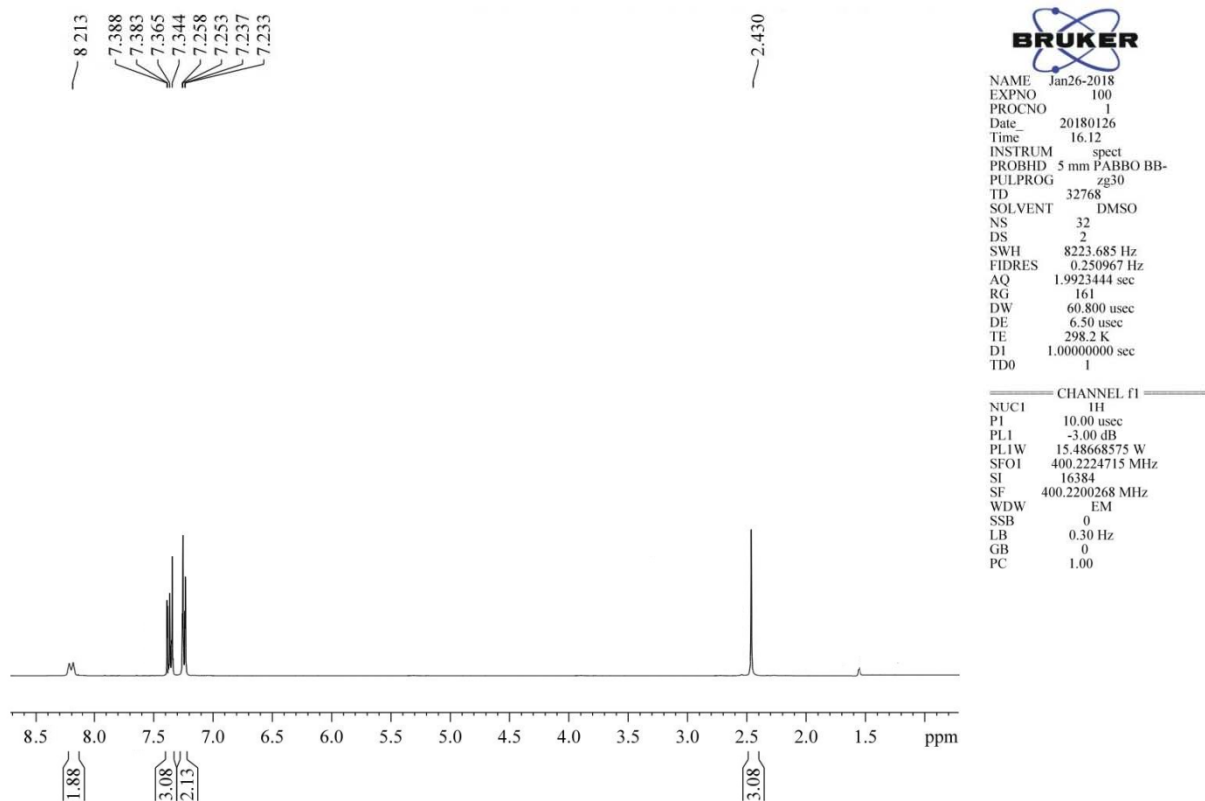


(S2) ^1H NMR of 2-Amino-5 (4-chloro phenyl) azo thiazole (**3b**)

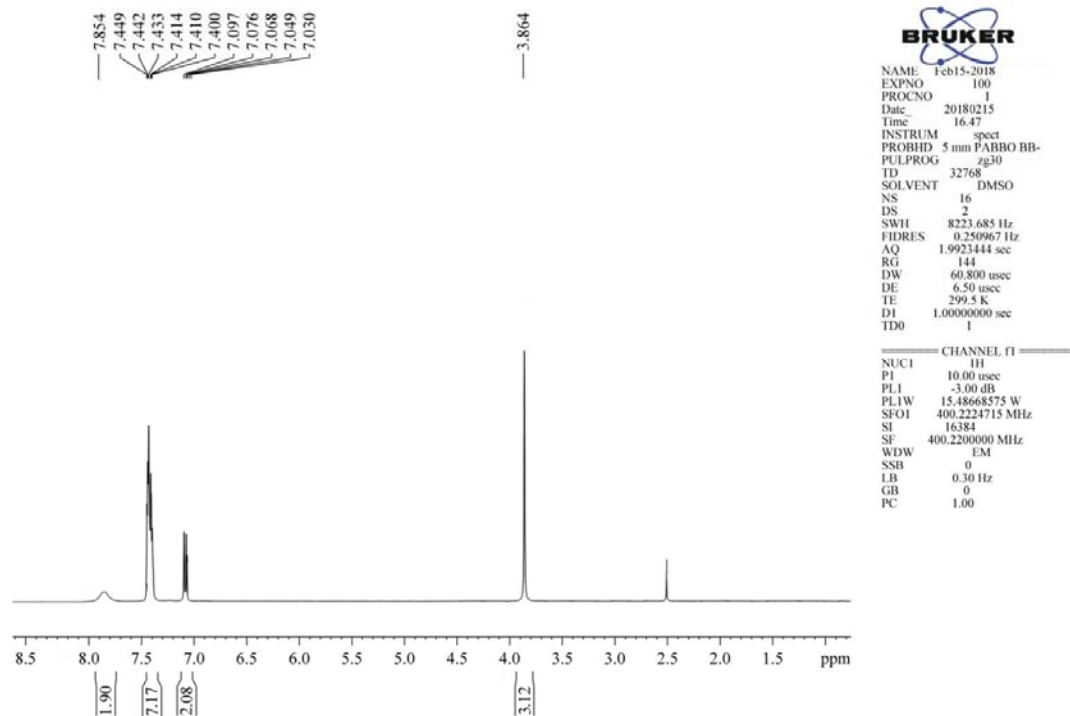


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 SOLVENT DMSO
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 DS 2
 SWH 8223.685 Hz
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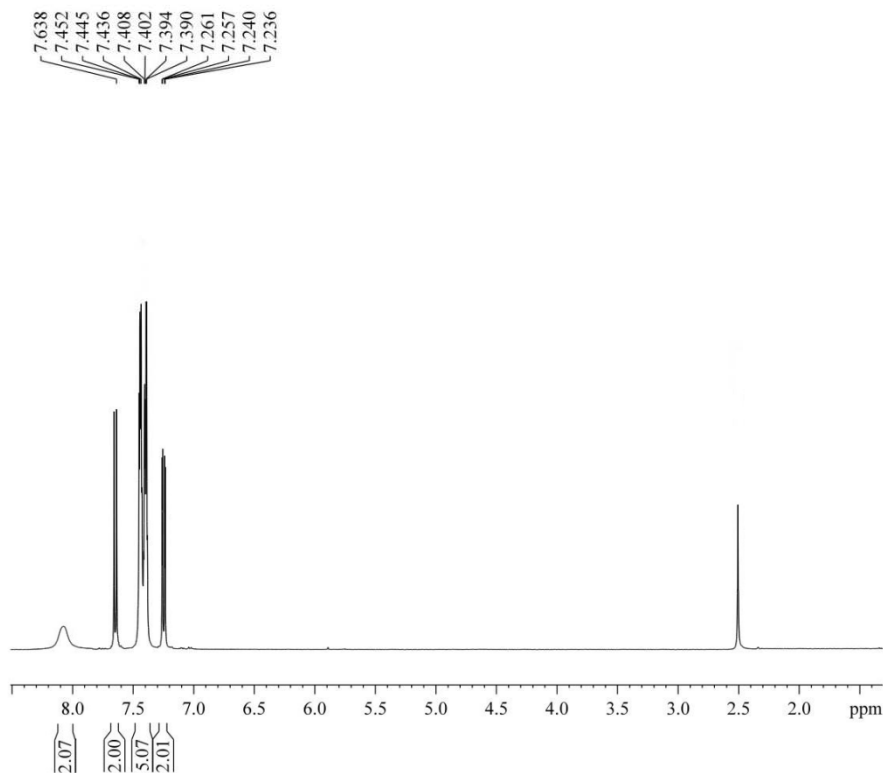
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 SI 16384
 SF 400.2200000 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



(S3) ^1H NMR of 2-amino-5-(4-acetylphenylazo)-thiazole (**3e**)



(S4) ^1H NMR of 2-amino-5-(4-anisylazo)-4-phenylthiazole (**3g**)

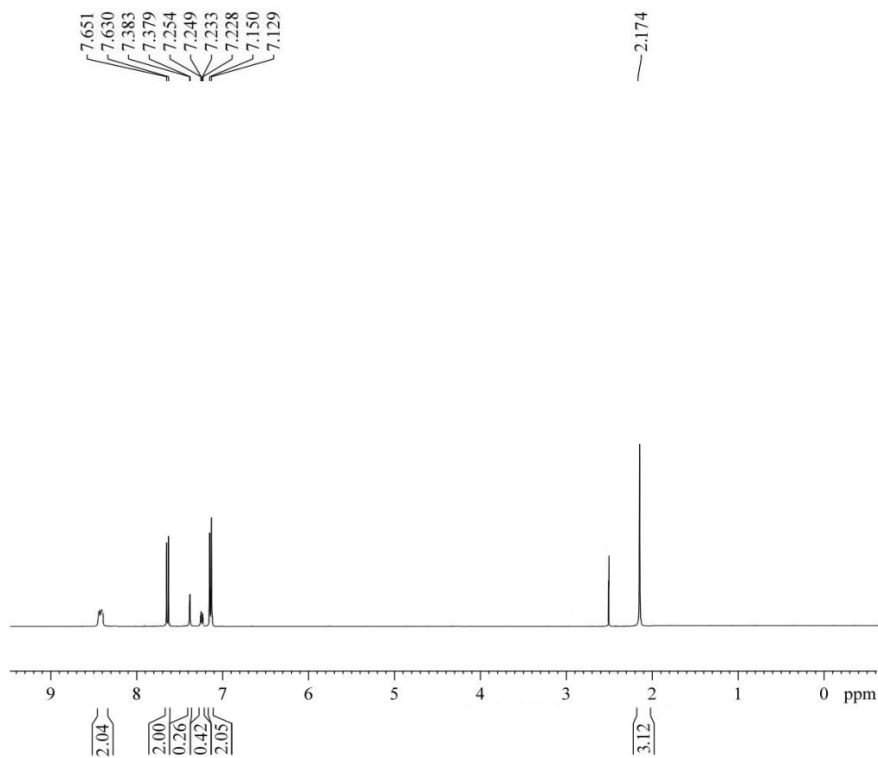


BRUKER

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SOLVENT DMSO
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DS 2
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 181
DW 60.800 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1

CHANNEL f1
NUC1 1H
P1 10.00 usec
PL1 -3.00 dB
PL1W 15.48668575 W
SFO1 400.2224715 MHz
SI 16384
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

(S5) ^1H NMR of 2-amino-5-(4-nitrophenylazo)-4-phenylthiazole (**3i**)

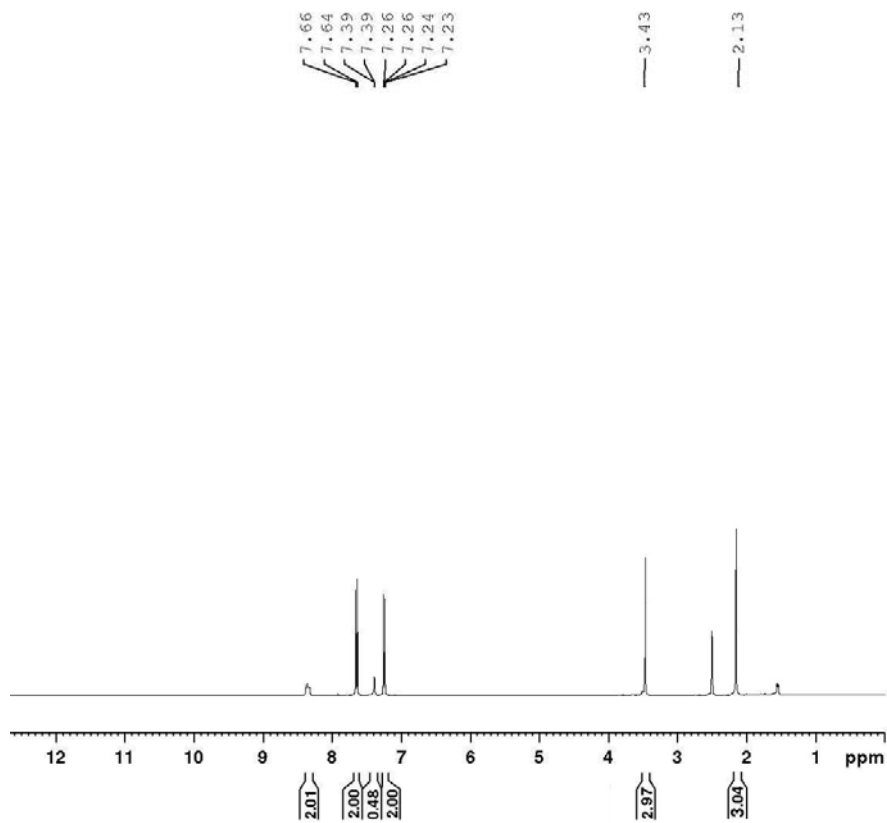


BRUKER

NAME Jan26-2018
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SOLVENT DMSO
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DS 2
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 161
DW 60.800 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1

CHANNEL f1
NUC1 1H
P1 10.00 usec
PL1 -3.00 dB
PL1W 15.48668575 W
SFO1 400.2224715 MHz
SI 16384
SF 400.2200000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

(S6) ^1H NMR of 2-Amino-4-methyl-5-(4-nitrophenylazo)thiazole (**3k**)



Current Data Parameters
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 PROCNO 1

F2 - Acquisition Parameters
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 PULPROG zg30
 TD 32768
 SOLVENT DMSO
 NS 32
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.250967 Hz
 AQ 1.9922944 sec
 RG 144
 DW 60.800 usec
 DE 6.50 usec
 TE 298.2 K
 D1 1.00000000 sec
 TDO 1

===== CHANNEL f1 =====
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 PL1 -3.00 dB
 PLLW 15.48668575 W
 SFO1 400.2224715 MHz

F2 - Processing parameters
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 SF 400.2199998 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 EC 1.00

(S7) ^1H NMR of 2-Amino-5-(4-anisylazo)-4-methylthiazole (**31**)