



1,5-Dithiobenzyl-1,5-diphenyl-1,4-pentadien-3-one (IIc). A sample of 1 g (4.3 mmoles) (Ib) in 20 ml absolute ethanol was added over 0.5 h to a stirred solution of  $\text{PhCH}_2\text{SNa}$  prepared from 1.2 g (9.6 mmoles)  $\text{PhCH}_2\text{SH}$  and 0.1 g (4.3 mmoles) sodium in 20 ml absolute ethanol with water cooling. After 2 h, 20 ml water was added and the mixture was extracted with ether. The residue after removal of the solvent was subjected to chromatography on a 30 × 2-cm column packed with grade-II silica gel using 1:1 benzene-ether as the eluent to give 1.33 g (65%) (IIc) as a thick brown oil. Found: C 78.01; H 5.94%. Calculated for  $\text{C}_{31}\text{H}_{24}\text{OS}_2$ : C 77.78; H 5.48%. PMR spectrum ( $\delta$ , ppm): 3.5 m ( $\text{CH}_2$ , 4H), 5.7 s, 6.3 s ( $\text{CH}=\text{C}$ , 2H), 7.3 m ( $\text{C}_6\text{H}_5$ , 20H). IR spectrum ( $\nu$ ,  $\text{cm}^{-1}$ ): 1609 (CO), 1550, 1490 ( $\text{CH}=\text{C}$ ).

1,5-Dithioisopropyl-1,5-diphenyl-1,4-pentadien-3-one (IIb). A solution of 1.16 ml (12.6 mmoles) *i*-PrSH and 0.1 g (0.98 mmole)  $\text{Et}_3\text{N}$  in 20 ml ether was added to 1.45 g (6.3 mmoles) (Ib) in 50 ml ether. The reaction mixture was stirred at about 20°C for 3 h. After removal of the solvent in vacuum, the residue was subjected to chromatography on a 30 × 2-cm column packed with grade-II silica gel using 3:1 benzene-ether as the eluent to give 1.6 g (71.4%) (IIb) as a thick red-brown oil. Found: C 72.41; H 6.82%. Calculated for  $\text{C}_{23}\text{H}_{26}\text{OS}_2$ : C 72.21; H 6.85%. PMR spectrum ( $\delta$ , ppm): 1.16 d, 1.33 d ( $\text{CH}_3$ , 12H), 2.9-3.3 m ( $\text{CH}$ , 2H), 6.3 s, 6.5 s ( $\text{CH}=\text{C}$ , 2H), 7.34 m ( $\text{C}_6\text{H}_5$ , 10H).

1,5-Dithioisopropyl-2,5-heptadien-4-one (IIa). A solution of 2.89 g (37.9 mmoles) *i*-PrSH and 0.1 g (0.98 mmole)  $\text{Et}_3\text{N}$  was added dropwise to a solution of 2 g (18.8 mmoles) (IIa) in 30 ml absolute ethanol. After stirring for 2 h at about 20°C the solvent was removed in vacuum. The residue was recrystallized from ethanol to give 2.29 g (47%) (IIa), mp 76°C. Found: C 60.67; H 8.67; S 24.72%. Calculated for  $\text{C}_{13}\text{H}_{22}\text{OS}_2$ : C 60.41; H 8.58; S 24.81%. PMR spectrum ( $\delta$ , ppm): 1.3 d ( $\text{CH}_3$ , 12H), 2.38 s ( $=\text{CCH}_3$ , 6H), 3-3.4 pent ( $\text{CH}$ , 2H), 5.93 s ( $\text{CH}=\text{C}$ , 2H).

1-Amino-1,5-diphenyl-5-thioisopropyl-1,4-pentadien-3-one (IIIb). A solution of 1.4 g (3.6 mmoles) (IIb) and 0.3 g (18 mmoles) ammonia in 10 ml ethanol was heated at 100°C in a sealed ampul for 8 h. The solvent was removed and the residue was subjected to chromatography on a 30 × 2-cm column packed with grade-II silica gel; the eluent was 3:1 benzene-ether. The yield was 0.72 g (66.6%) (IIIb) as a thick oil. Found: C 74.87; H 6.67; S 9.72; N 4.20%. Calculated for  $\text{C}_{20}\text{H}_{21}\text{NSO}$ : C 74.27; H 6.54; S 9.91; N 4.33%. PMR spectrum ( $\delta$ , ppm): 1.2-1.33 d ( $\text{CH}_3$ , 12H), 2.8-3.1 m ( $\text{CH}$ , 2H), 5.4 s ( $\text{CH}=\text{CN}$ , 1H), 6.2 s ( $\text{CH}=\text{CS}$ , 1H), 7.28 m ( $\text{C}_6\text{H}_5$ , 10H). IR spectrum ( $\nu$ ,  $\text{cm}^{-1}$ ): 3480, 3400, 1590 ( $\text{NH}_2$ ), 1610 (CO), 1560, 1490 ( $\text{C}=\text{C}$ ).

2-Amino-6-thioisopropyl-2,5-heptadien-4-one (IIIa). A solution of 1.3 g (5.7 mmoles) (IIa) and 1.15 g (67 mmoles)  $\text{NH}_3$  in 20 ml ethanol was heated in a sealed ampul for 2 h at 120°C. The solvent was removed and the residue was recrystallized from ethanol to give 0.82 g (72.4%) (IIIa), mp 65°C. Found: C 60.56; H 8.86; S 15.92%. Calculated for  $\text{C}_{10}\text{H}_{17}\text{ONS}$ : C 60.26; H 8.60; S 16.09%. PMR spectrum ( $\delta$ , ppm): 1.2-1.3 d ( $(\text{CH}_3)_2\text{CH}$ , 6H), 1.9 s ( $\text{CH}_3\text{CN}$ , 3H), 2.35 s ( $\text{CH}_3\text{CS}$ , 3H), 3.0-3.4 m ( $\text{CH}$ , 1H), 4.9 s ( $\text{CH}=\text{CN}$ , 1H), 5.85 s ( $\text{CH}=\text{CS}$ , 1H). IR spectrum ( $\nu$ ,  $\text{cm}^{-1}$ ): 3490, 3400, 1598 ( $\text{NH}_2$ ), 1630 (CO), 1565 ( $\text{C}=\text{C}$ ).

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#### CONCLUSIONS

Syntheses are reported for  $\beta, \beta'$ -dithioalkyldivinyl ketones, which react with ammonia to give  $\beta$ -amino- $\beta'$ -thioalkyldivinyl ketones.

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