بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــســـم ﴾

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بعض الوثائق الأصلية تالفة

بالرسالة صفحات

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A THESIS
ENTITLED

SYNTHESIS AND CHARACTERIZATION OF SOME POLYFUNCTIONALIZED HETEROCYCLIC DERIVATIVES OF EXPECTED BIOLOGICAL ACTIVITY

Presented By
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(B. Sc., Chemistry)

Submitted For the Partial Fulfillment of the Requirements of the Degree of Master of Science in Organic Chemistry

DEPARTMENT of CHEMISTRY
FACULTY of SCIENCE
CAIRO UNIVERSITY

2001

ABSTRACT

Name : Mohamed Salah El-sayed
Title : Synthesis and characterization of some polyfunctionalized heterocyclic derivatives of expected biological activity
Degree : M. Sc. degree, Chemistry Department, Faculty of Science, Cairo University (2000-2001)

The reaction of thiocyanoacetamide **1** with α,β-unsaturated ketones **2a,b** resulted in the formation of the corresponding newly synthesized 2(1H)-pyridine-thione derivatives **3a,b**. compounds **3a,b** were used as synthons for the preparation of 2-S-alkyl-, 2-S-aryl-, 2-S-acetamidopyridine, thieno[2,3-b]pyridine and pyrazolo[3,4-b] pyridine derivatives via a wide range of reactions with different reagents. The pyrazolopyridine derivatives **20a,b** reacted with phenylisothiocyanate **22**, nitrous acid and cinnamonitrile derivatives **24a,b** to afford the corresponding pyrazolo[3,4-b] pyridinyl-3-phenylthiourea derivatives **23a,b**, 3-diazotized amino-pyrazolo[3,4-b] pyridine derivatives **21a,b** and Schiff's bases **27a-d** in a respective manner. Considering the data of elemental analyses, IR, ^{1}H-NMR and mass spectra elucidated all structures of the newly synthesized compounds.

Key words: Pyridinethione, 2-S-alkylpyridines, pyrazolopyridines, thieno-pyridines, pyridopyrazolotriazines.

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AIM OF THE PRESENT WORK

The present work was aimed and designed for the following

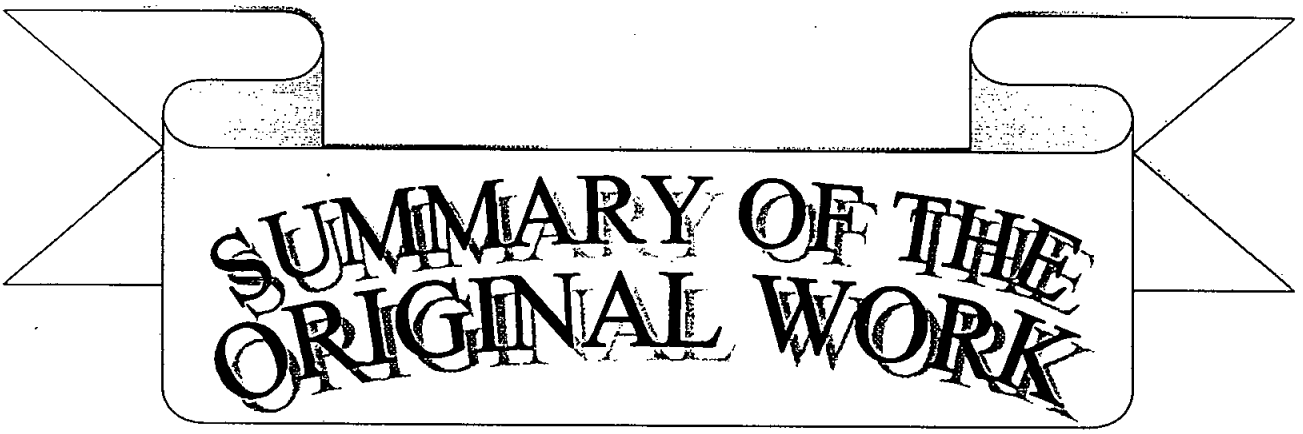
1- Synthesis of several new heterocyclic derivatives containing N and/or S using the laboratory available reagents.

2- Establishment of the structures of the newly synthesized heterocyclic compounds by the data of IR, ^{1}H-NMR, mass spectra in addition to the elemental analyses.

3- Synthesis of some of these heterocyclic derivatives via alternative routes and this used as a tool to confirm the structures of the newly synthesized heterocyclic derivatives.

4- Study of the most probable mechanisms leading to the formation of the new heterocyclic derivatives.

CONTENTS


SUMMARY OF THE
ORIGINAL WORK

SUMMARY OF THE ORIGINAL WORK

1-The starting materials **3a,b** ; **20a,b** ; **21a,b** and **23a,b**:

(i) Cyanothioacetamide **1** reacted with 4-arylbut-3-en-2-one **2a,b** to give the corresponding pyridinethione derivatives **3a,b** (cf. Chart 1).

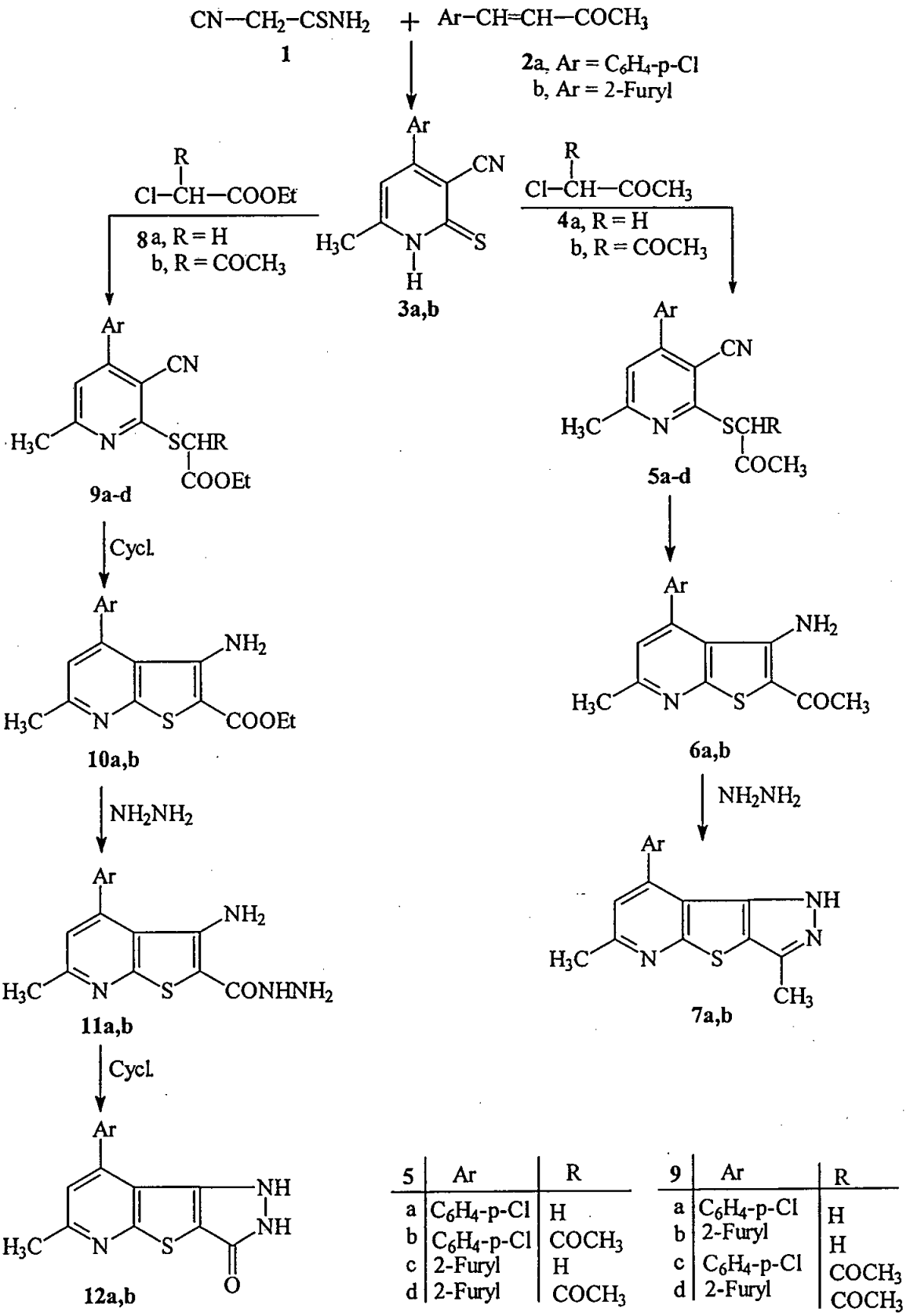
(ii) 2-S-methylpyridines **19a,b** and pyridinethiones **3a,b** reacted with hydrazine hydrate to afford the corresponding 3-aminopyrazolo[3,4-b] pyridines **20a,b** (cf. Chart 2).

(iii) 3-Aminopyrazolo[3,4-b]pyridines **20a,b** reacted with phenylisothiocyanate (**22**) and nitrous acid to afford the corresponding diazonium chlorides **21a,b** and phenylthiourea derivatives **23a,b** (cf. Charts 3 and 5).

2- Pyridinethiones **3a,b** reacted with the halogen containing reagents **4a,b**; **8a,b**; **13**; and **16** to give the corresponding 2-S-alkyl-derivatives **5a-d**; **9a-d**; **14a,b** and **17a,b**. The obtained 2-S-alkyl-derivatives underwent subsequent cyclization to give the corresponding thieno[2,3-b]pyridines in each case (cf. Charts 1 and 2).

3- 3-Aminopyrazolo[3,4-b]pyridines **20a,b** reacted with phenylisothiocyanate (**22**) to give the corresponding phenylthiourea derivatives **23a,b**. compounds **23a,b** reacted with the reagents **4a,b**; **8a** and **16** to give the corresponding pyrazolopyridine derivatives **30-32a,b** respectively (cf. Charts 3 and 4).

4- Compounds **20a,b** reacted with either cinnamonitriles **24a,b** or aromatic aldehydes **25a,b** to give the corresponding Schiff's bases **27a-d** which reacted with thioglycollic acid (**28**) to give the corresponding pyrazolopyridines derivatives **29a-d** respectively (cf. Chart 3).



5	Ar	R
a	C_6H_4-p-Cl	H
b	C_6H_4-p-Cl	$COCH_3$
c	2-Furyl	H
d	2-Furyl	$COCH_3$

9	Ar	R
a	C_6H_4-p-Cl	H
b	2-Furyl	H
c	C_6H_4-p-Cl	$COCH_3$
d	2-Furyl	$COCH_3$

Chart 1

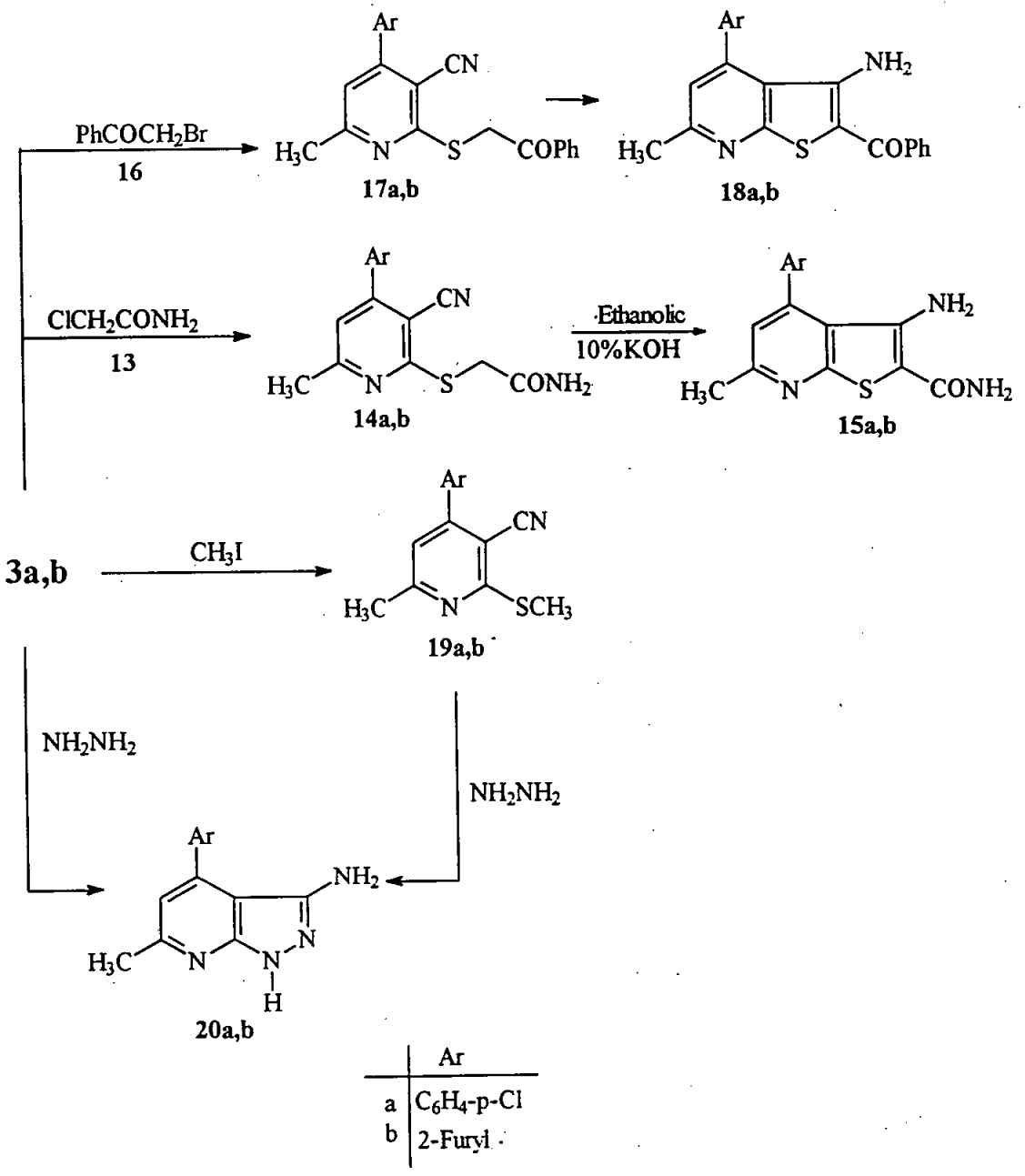

Ar
CN
NH2
PhCOCH2Br
16
H3C
N
S
COPh
17a,b
18a,b
ClCH2CONH2
13
CONH2
Ethanolic
10%KOH
14a,b
15a,b
3a,b
CH3I
SCH3
19a,b
NH2NH2
20a,b
Ar
a C6H4-p-Cl
b 2-Furyl

Chart 2

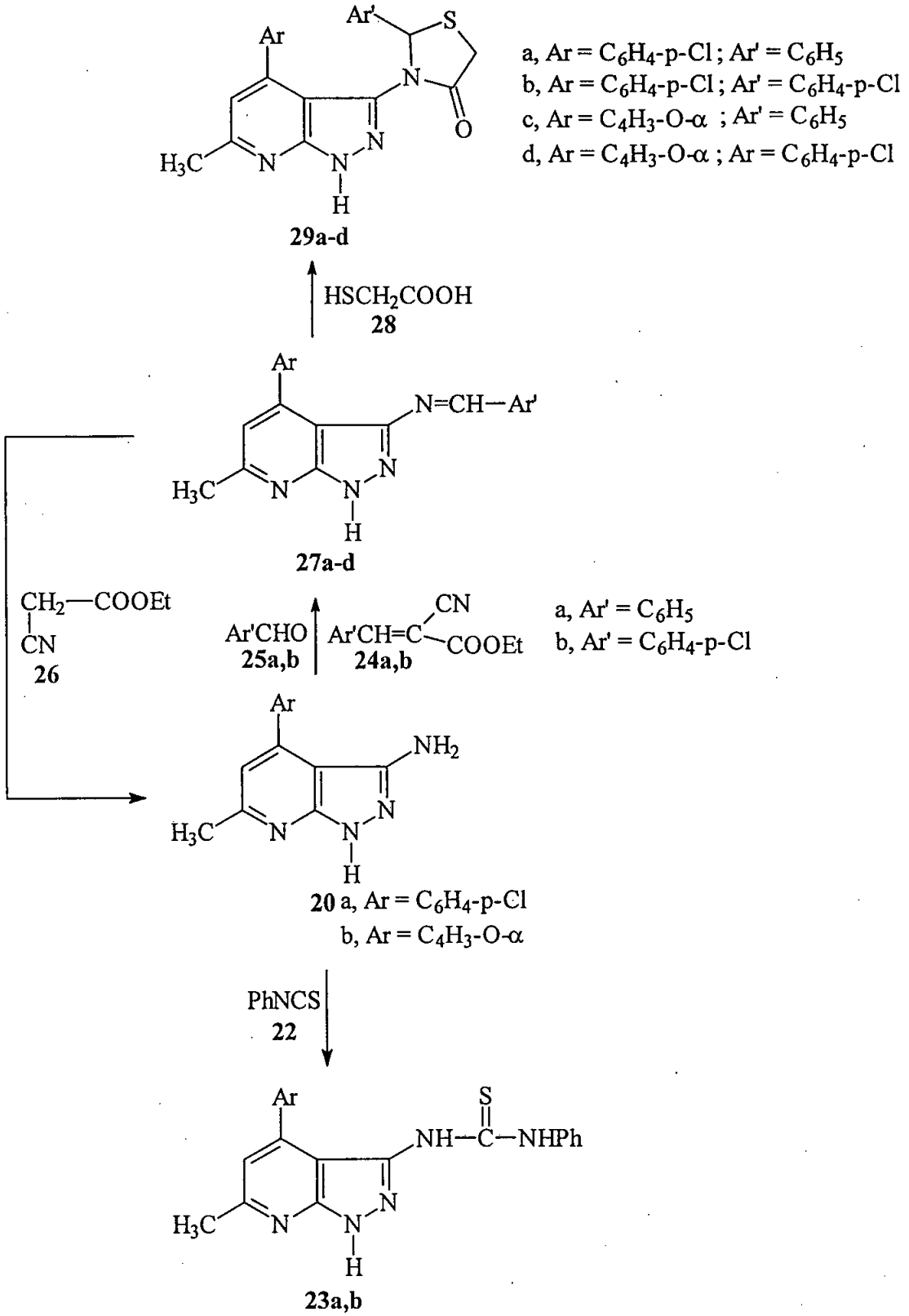

a, Ar = C6H4-p-Cl ; Ar' = C6H5
b, Ar = C6H4-p-Cl ; Ar' = C6H4-p-Cl
c, Ar = C4H3-O-α ; Ar' = C6H5
d, Ar = C4H3-O-α ; Ar = C6H4-p-Cl
29a-d
HSCH2COOH
28
N=CH—Ar'
27a-d
CH2—COOEt
CN
26
Ar'CHO
25a,b
Ar'CH=C
CN
COOEt
24a,b
a, Ar' = C6H5
b, Ar' = C6H4-p-Cl
NH2
20 a, Ar = C6H4-p-Cl
b, Ar = C4H3-O-α
PhNCS
22
NH—C—NHPh
S
23a,b

Chart 3