Supplementary Information

Copper Catalyzed Synthesis of Fused Benzimidazolopyrazine Derivatives via Tandem Benzimidazole formation/Annulation of $\delta$-alkynylaldehyde

Subburethinam Ramesh, Suman Kr Ghosh and Rajagopal Nagarajan*

$^1$H and $^{13}$C spectra of 3a-r, 5a-c, 7a-c
$^1$H and $^{13}$C Spectra of 3a

![Spectra Image]
HRMS of 3α
$^1$H Spectrum of 3b

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HRMS of 3b
$^1$H Spectrum of 3c and 3c’

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HRMS of 3c and 3c'
$^1$H and $^{13}$C Spectra of 3d

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HRMS of 3d

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**Analysis Info**
- **Analysis Name**: D:\Date2012\Dr.R.Nagarajan\SEP'T\SRM-305.d
- **Method**: tune_low.m
- **Sample Name**: SRM-306-DCM-MEOH
- **Comment**: 

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- **Set Nebulizer**: 4.4 psi
- **Set Dry Heater**: 180 °C
- **Set Dry Gas**: 4.0 l/min
- **Set Divert Valve**: Waste

**Bruker Compass Data Analysis 4.0**

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$^1$H and $^{13}$C Spectra of 3e

3e

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HRMS of 3e
$^1$H and $^{13}$C Spectra of 3f and 3f'

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HRMS of 3f and 3ff

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Printed: 10/5/2012 10:09:17 AM
\textsuperscript{1}H and \textsuperscript{13}C Spectra of 3g
HRMS of 3g
$^1$H and $^{13}$C Spectra of 3h
$^1$H and $^{13}$C Spectra of 3i

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HRMS of 3i
$^1$H and $^{13}$C Spectra of 3j and 3j'
HRMS of 3j and 3j'
$^1\text{H}$ and $^{13}\text{C}$ Spectra of 3k
HRMS of 3k
$^1$H and $^{13}$C spectra of compounds 3l

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**HRMS of 3l**

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**Graph**

- Mass: 302.1293
- m/z: 261.1276, 271.0495, 291.1587, 324.1091, 345.1803

**Bruker Compass DataAnalysis 4.0**

(printed: 7/16/2013 1:07:21 PM)
$^1$H and $^{13}$C spectra of compounds 3m and 3m'
$^1$H and $^{13}$C spectra of compounds 3n and 3n'
HRMS of 3n and 3n'

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Analysis Info
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Method tune_low_Pos-R2.m
Sample Name SRM-044-dcm-mesh
Comment
Acquisition Date 3/28/2013 11:44:23 AM
Operator Rajesh Vashiath
Instrument maxis 10138

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Set Nebulizer 4.4 psi
Set Dry Heater 180°C
Set Dry Gas 4.0 l/min
Set Divert Valve Waste

+NS, 0-4.0 min #25-45

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Page 1 of 1
$^1$H and $^{13}$C spectra of compound 3o'
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**HRMS of 3o’**

**Bruker Compass DataAnalysis 4.0**  
**Printed: 7/15/2013 3:43:19 PM**
$^1$H and $^{13}$C spectra of compounds 3p and 3p'
HRMS of 3p and 3p'

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School of Chemistry
University of Hyderabad

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![HRMS Graph]

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$^1$H and $^{13}$C spectra of compounds 3q
**HRMS of 3q**

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![HRMS Graph](image)

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$^{1}$H spectrum of compounds 3r and 3r′
HRMS of 3r and 3r'
1H and $^{13}$C Spectra of 5a

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HRMS of 5a

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**Analysis Info**
- **Analysis Name**: D:\Data\2012\Dr.R.Nagarejjan\OCT\SRM-307.d
- **Method**: tune_bow_Pos.m
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- **Comment**:

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- **Set Nebulizer**: 4.4 psi
- **Set Dry Heater**: 150 °C
- **Set Dry Gas**: 4.0 l/min
- **Set Divert Valve**: Waste

**Intens. x10^9**

- 222.1033
- 223.1055

**SRM-307-DCM-MEOH**

**Operator**: UOH

**Instrument**: maXis

**Acquisition Date**: 10/11/2012 10:23:51 AM

**Printed**: 10/11/2012 11:10:15 AM

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$^1\text{H and } ^{13}\text{C Spectra of 5b}$

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HRMS of 5b
$^1$H and $^{13}$C Spectra of 5c and 5c'
HRMS of 5c and 5cc

Display Report

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Set End Plate Offset: -500 V
Set Collision Cell RF: 350.0 Vpp

Set Nebulizer: 4.4 psi
Set Dry Heater: 150 °C
Set Dry Gas: 4.0 L/min
Set Divert Valve: Waste

Intens. x10^n

+MS, 0.4 min #24

272.1187

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\(^1\)H and \(^{13}\)C Spectra of 7a

Ts

CH\(_3\)

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HRMS of 7a
$^1$H and $^{13}$C Spectra of 7b

[Image of the spectra with chemical shifts and isotope values labeled]
HRMS of 7b

Display Report

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Instrument maXis 10138

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Parameter
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Set Dry Heater 180°C
Set Dry Gas 4.0 l/min
Set Divert Valve Waste

Intensity x10^4

390.1275
242.2838
352.1110
412.1095

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$^1$H and $^{13}$C Spectra of 7c and 7c'

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HRMS of 7c and 7c'