10.1071/CH10470_AC

Australian Journal of Chemistry 2011, 64(4), 443–453

Accessory Publication

Reaction of *N*-acyloxy-*N*-alkoxyamides with Biological Thiol Groups

Stephen A. Glover[A,B] and Meredith Adams[A]

[A] Department of Chemistry, School of Science and Technology, University of New England, Armidale, New South Wales 2350, Australia.

[B] Corresponding author. E-mail: sglover@une.edu.au.

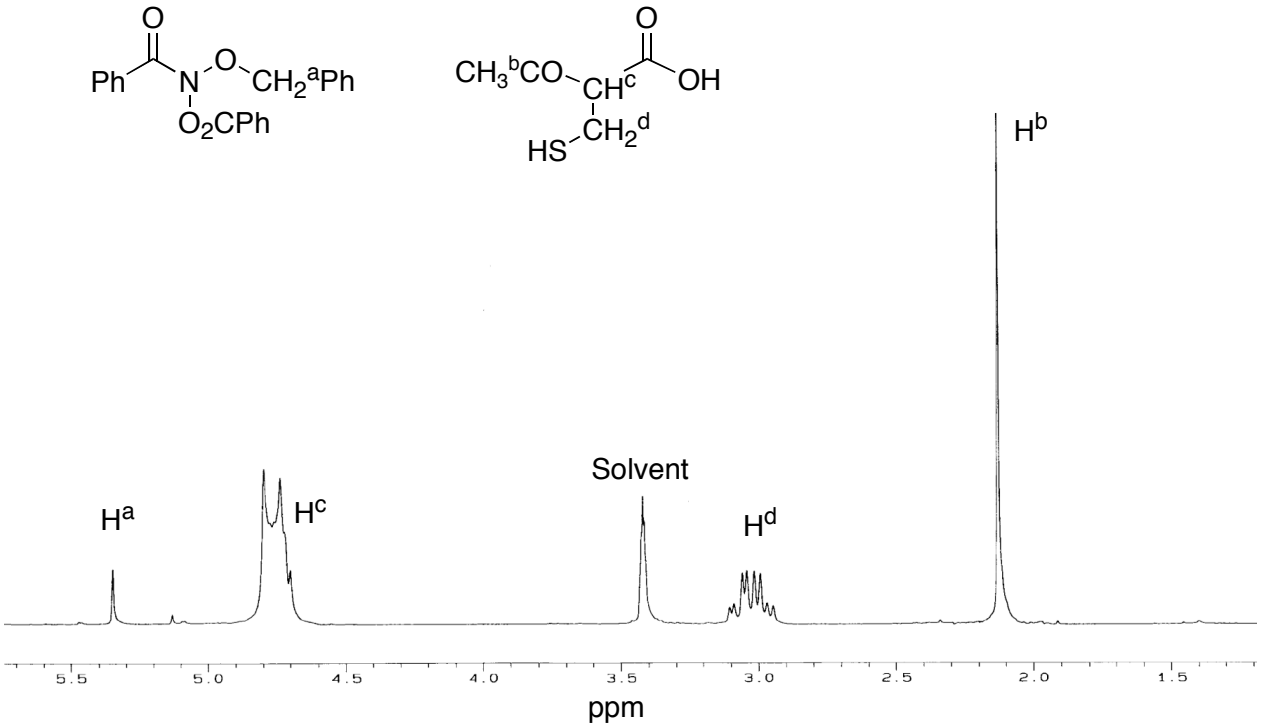

Figure S1. ^{1}H NMR spectrum of *N*-benzoyloxy-*N*-benzyloxybenzamide **13** and *N*-acetylcysteine **10** after 45 minutes at 303K in [D4]Methanol. The spectrum shows no oxidation of the *N*-acetylcysteine nor conversion of *N*-benzoyloxy-*N*-benzyloxybenzamide to *N*-benzyloxybenzamide **18.**

B3LYP/6-31G* calculations

Lowest energy conformations:

N-*Methoxy*-N-*(methylthio)acetamide* ***24*** *(cisSendoOexo)*[A]

Energy: -761.165884 au
C=O stretch frequency: 1803 cm^{-1}
XYZ coordinate system:

C	0.779427	-1.109601	-0.155776
O	0.199558	-2.113532	-0.519615
N	0.167113	0.154733	-0.243202
O	0.747093	1.142912	0.595327
C	1.166412	2.263385	-0.186075
H	0.312345	2.725429	-0.694611
H	1.924424	1.972832	-0.923606
H	1.591932	2.968289	0.532758
S	-1.509216	0.332836	-0.571330
C	-2.266914	-0.321972	0.960028
H	-3.347697	-0.185779	0.851606
H	-1.918257	0.238937	1.830244
H	-2.041851	-1.385515	1.062382
C	2.196595	-1.106484	0.384253
H	2.602228	-2.111182	0.256051
H	2.201334	-0.838663	1.445520
H	2.826881	-0.379858	-0.136926

ZPE: 353.557 $kJmol^{-1}$
Enthalpy: 383.252$kJmol^{-1}$

N-*Methoxy*-N-*(methylthio)acetamide* ***24*** *(cisSOexo)*[A]
Energy:-761.163308 au
XYZ coordinate system:

C	1.014746	0.996723	0.006994
O	0.560020	2.120414	0.108199
N	0.159925	-0.100925	-0.164058
O	0.784075	-1.321896	-0.494798
C	0.472371	-2.320696	0.478711
H	-0.605267	-2.521017	0.498229
H	0.816431	-2.023949	1.477029
H	1.003955	-3.216231	0.147641
S	-1.466168	0.087024	-0.722753
C	-2.345776	0.360876	0.854949
H	-3.401880	0.478415	0.589326
H	-1.988567	1.279591	1.324487
H	-2.238275	-0.488599	1.533780
C	2.491570	0.668555	0.105293
H	3.021934	1.594044	0.333761
H	2.857520	0.252079	-0.838380

[A] Sulfur *cis* or *trans* to the carbonyl oxygen; SMe or OMe *endo* or *exo* to the pyramid prescribed by nitrogen and the three attached atoms.

H	2.687882	-0.074185	0.884582

N-*Methoxy*-N-*(methylthio)acetamide* ***24*** *(transSOexo)*[A]
Energy: -761.160178 au
XYZ coordinate system:

C	1.245931	-0.690647	-0.045616
O	2.359395	-0.204418	-0.023918
N	0.106699	0.114741	0.153813
O	0.388086	1.412055	0.642310
C	0.674182	2.306723	-0.437247
H	-0.160878	2.358223	-1.147177
H	1.594431	2.016359	-0.951359
H	0.809252	3.279803	0.042300
S	-1.422245	-0.491648	0.646906
C	-2.477245	-0.013771	-0.768433
H	-3.476417	-0.400389	-0.540697
H	-2.120045	-0.463775	-1.698000
H	-2.532075	1.072712	-0.866233
C	0.985626	-2.152733	-0.361537
H	0.194943	-2.281369	-1.105892
H	0.679675	-2.697333	0.537822
H	1.920464	-2.574867	-0.734657

N-*Methoxy*-N-*(methylthio)acetamide* ***24*** *(transSendoOexo)*[A]
Energy: -761.162886 au
XYZ coordinate system:

C	-0.946838	-1.010103	-0.091564
O	-2.059372	-0.954331	-0.577519
N	-0.189848	0.156744	0.102466
O	-0.693760	1.306390	-0.528841
C	-1.547794	2.034340	0.360573
H	-1.007996	2.326807	1.269581
H	-2.435103	1.445302	0.611027
H	-1.838807	2.926997	-0.198920
S	1.430920	0.264582	0.633314
C	2.352286	0.168540	-0.947046
H	3.406571	0.329033	-0.699743
H	2.014179	0.957497	-1.621842
H	2.233981	-0.811685	-1.416011
C	-0.311761	-2.303487	0.389597
H	-1.042078	-3.098689	0.232121
H	-0.042576	-2.253973	1.448567
H	0.601769	-2.533901	-0.169005

N,N-*Dimethylacetamide* ***25***
Energy:-287.830196 au
C=O stretch frequency: 1764 cm^{-1}
XYZ coordinate system:

H	2.755227	0.326788	0.017950
C	1.779169	0.812361	0.000022

H	1.689989	1.462000	0.877883
H	1.714508	1.443186	-0.893634
C	0.728813	-0.294522	-0.003354
O	1.066182	-1.474091	0.007794
N	-0.595866	0.083523	-0.025435
C	-1.080819	1.450823	0.008583
H	-1.595637	1.666656	0.956798
H	-1.798447	1.617618	-0.806393
H	-0.266420	2.164119	-0.108385
C	-1.625977	-0.944101	0.002226
H	-2.228956	-0.865459	0.917414
H	-1.139711	-1.917898	-0.029898
H	-2.296064	-0.836300	-0.860902

N-*Methoxyacetamide* ***26***
Energy:-323.677201 au
C=O stretch frequency: 1808 cm^{-1}
XYZ coordinate system:

H	2.084272	1.741414	0.197269
C	1.070207	1.389195	0.003452
H	0.383342	1.802180	0.748956
H	0.737090	1.744758	-0.977256
C	1.080484	-0.123299	0.036444
O	2.086099	-0.805894	0.130088
N	-0.166095	-0.745956	0.014646
H	-0.134356	-1.704874	-0.326239
O	-1.225198	-0.033012	-0.584216
C	-2.315014	0.071564	0.333311
H	-3.077538	0.652184	-0.192698
H	-2.015072	0.589747	1.251550
H	-2.716334	-0.917228	0.589682

ZPE: 279.5848 $kJmol^{-1}$
Enthalpy: 301.0486 $kJmol^{-1}$

N-*(Thiomethyl)acetamide* ***27***
Energy: -646.698507 au
C=O stretch frequency: 1802 cm^{-1}
XYZ coordinate system:

H	2.331365	1.768093	-0.631118
C	1.317450	1.366687	-0.609670
H	0.674899	2.034538	-0.025435
H	0.909689	1.331857	-1.624531
C	1.378217	-0.016045	0.008077
O	2.406882	-0.524268	0.420412
N	0.183486	-0.724500	0.105878
H	0.298847	-1.657331	0.490739
S	-1.358945	-0.292926	-0.494141
C	-2.146143	0.472212	0.971519
H	-2.216296	-0.240393	1.797193
H	-3.156349	0.756455	0.657813

H	-1.606277	1.367191	1.291295

N,N-*Dimethoxyacetamide* ***28***
Energy: -438.150456 au
C=O stretch frequency: 1813 cm^{-1}
XYZ coordinate system:

H	-1.299183	-2.247530	0.238355
C	-1.753271	-1.404261	-0.289187
H	-1.527499	-1.524895	-1.354314
H	-2.834769	-1.407845	-0.143910
C	-1.220097	-0.076622	0.205531
O	-1.913084	0.880286	0.484602
O	0.897401	-0.842818	-0.497067
O	0.767981	1.191957	0.602365
C	0.716540	2.020665	-0.578351
H	1.196817	1.516181	-1.422419
H	1.282366	2.914731	-0.308481
H	-0.315685	2.287961	-0.816050
C	1.977553	-1.493579	0.182021
H	2.643144	-0.756859	0.642709
H	2.512093	-2.045367	-0.595043
H	1.600465	-2.182516	0.945990
N	0.177564	-0.051585	0.425214

Methanethiol
Energy:-438.698376 au

H	1.531487	-1.009762	-0.000000
C	1.165064	0.019473	0.000000
H	1.535887	0.522788	0.895758
H	1.535887	0.522788	-0.895758
S	-0.667876	-0.087103	-0.000000
H	-0.907625	1.240997	0.000000

ZPE: 122.013 $kJmol^{-1}$
Enthalpy: 133.936 $kJmol^{-1}$

Dimethyl disulfide
Energy: -876.207519 au

H	-2.880393	0.046051	0.790349
C	-1.877507	-0.393320	0.806036
H	-1.441762	-0.250533	1.797618
H	-1.945656	-1.458042	0.573168
S	-0.917094	0.493159	-0.484614
S	0.917094	-0.493159	-0.484614
C	1.877507	0.393320	0.806036
H	1.441762	0.250533	1.797618
H	1.945656	1.458042	0.573168
H	2.880393	-0.046051	0.790349

ZPE: 205.1539 $kJmol^{-1}$
Enthalpy: 224.4176 $kJmol^{-1}$