950069

MILLENNIUM APPLICATION

BRIEF

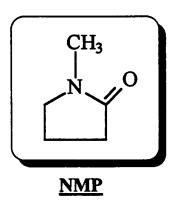
TOPIC: Capillary Electrophoresis of N-methyl-2-pyrrolidinone (NMP) in Etchants

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Date: 01/3/95

Introduction:

Analysis of NMP (N-methyl-2-pyrrolidinone) in etchants was done. Samples of three etchants (one of which was not NMP based) were diluted and analyzed using the Q4000e CIA. Since NMP is a neutral compound MECC (micellar electrokinetic capillary chromatography) was used. The structure of NMP is shown below. All samples were diluted (10uL-100mL) with the running buffer. Plastic volumetric flask were used for all dilution's and sample prep. Analysis of these mixes showed NMP present. Figure 1 is an electropherogram of a methanol-water blank used for marking the void. Figure 2 is an electropherogram of a NMP standard. Figure 3 is an electropherogram of the quartz etchant showing no NMP present. This was expected since its composition is a mix of HF and NH₄F. Figure 4 and 5 of the intermediate and final etchants, show the presence of NMP. This was expected since they are composed of HF and NMP. The main interest here was in monitoring the level of NMP present as well as other cations and anions present in the etchants. Changeover time from cation analysis to MECC was less than 10 minutes.



EXPERIMENTAL:

MECC Analysis

System: Q4000E

Electrolyte: Sodium borate/Boric acid/SDS

Capillary: 75um X 60cm

Injection: Hydrostatic, 30 seconds

Run Voltage: +20kV

Detection: Indirect UV at 185nm

Data: Millennium 2010 Chromatography Manager, Ver. 2.1 with

CIA Option

FIGURES:

- Figure 1: Electropherogram of methanol-water void marker
- Figure 2: Electropherogram of NMP standard
- Figure 3: Electropherogram of quartz etchant (NH₄:HF)
- Figure 4: Electropherogram of intermediate etchant (NMP:HF)
- Figure 5: Electropherogram of final etchant (HF:NMP)

Millennium Results Report: HF MECC

Proc Chan: SATIN

Page 1 of

For Sample: H2O/MeOH Blank Vial: 1 Inj: 1 Chan: SATIN

Date Processed 12/28/94 02:03:34 PM

Channel Descr: Direct UV

Northern Kentucky Laboratory Sample Information

Project Name:

CIA_HF_01

SampleName:

H2O/MeOH Blank

Vial:

Injection:

1

Sample Type:

Hydrostatic Unknown

1

Volume:

0.00

Channel:

SATIN

Run Time:

10.0 min

Date Acquired:

12/28/94 12:23:57 PM

Date Processed:

12/28/94 02:03:34 PM

Scale Factor:

1.00

Dilution:

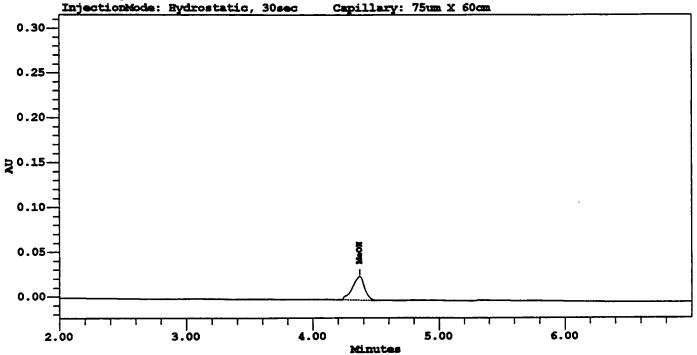
1.00000

Acq Meth Set: Processing Method:

CE Control MECC HF_MECC_01a

SampleName: H2O/MeOH Blank Electrolyte: 12.5 Boric Acid/2.5 NaBorate/50mM SDS

RunVoltage: +20kV Detection: Direct UV 185nm, 0.3 TC



Peak Results

#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)
1	MeOH	4.370	173730	39755.24	26335

Millennium Results Report: HF_MECC

Proc Chan: SATIN

Page 1 of

For Sample: NMP-

(0 Vial: 4 Inj: 1 Chan: SATIN Date Processed 12/28/94 02:04:25 PM

Channel Descr: Direct UV

Northern Kentucky Laboratory Information Sample

Project Name:

CIA HF 01

SampleName:

NMP-

(0.01-10mL)

Vial:

Injection:

Channel:

1

Volume:

Hydrostatic Unknown 0.00

SATIN

Run Time:

8.0 min

Date Acquired:

12/28/94 01:03:03 PM

Date Processed:

Sample Type:

12/28/94 02:04:25 PM

Scale Factor:

1.00

Dilution:

1.00000

Acq Meth Set:

CE Control MECC

Processing Method:

HF MECC 01

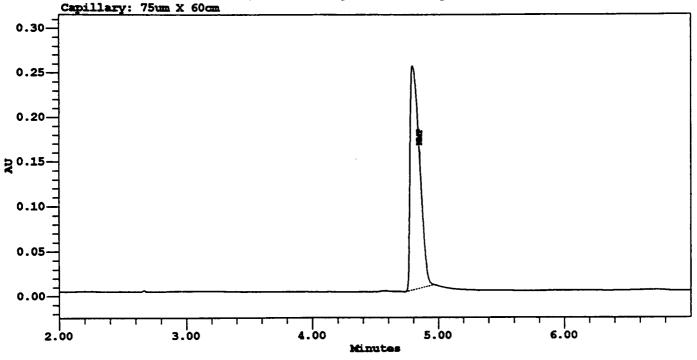
SampleName: NMP-

(0.01-10mL)

Electrolyte: 12.5 Boric Acid/2.5 NaBorate/50mM SDS

RunVoltage: +20kV

Detection: Direct UV 185nm, 0.3 TC InjectionMode: Hydrostatic, 30sec



Peak Results

#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)
1	NMP	4.852	1335716	275310.82	251106

Millennium Results Report: HF_MECC Proc Chan: SATIN Page 1 of For Sample: Quartz Etch (0. Vial: 5 Inj: 1 Chan: SATIN Date Processed 12/28/94 01:59:09 PM

Channel Descr: Direct UV

Northern Kentucky Laboratory
Sample Information

Project Name:

CIA HF 01

SampleName:

Quartz Etch (0.02-10mL)

Vial:

5

Sample Type:

Hydrostatic Unknown

Injection:

5

Volume:

0.00

Channel:

1 SATIN

Run Time:

8.0 min

Date Acquired:

12/28/94 01:14:41 PM

Date Processed:

12/28/94 01:59:09 PM

Scale Factor:

1.00

Dilution:

500.00000

Acq Meth Set: Processing Method: CE_Control_MECC HF MECC_01

SampleName: Quartz Etch (0.02-10mL)

Electrolyte: 12.5 Boric Acid/2.5 NaBorate/50mM SDS RunVoltage: +20kV Detection: Direct UV 185nm, 0.3 TC InjectionNode: Hydrostatic, 30sec

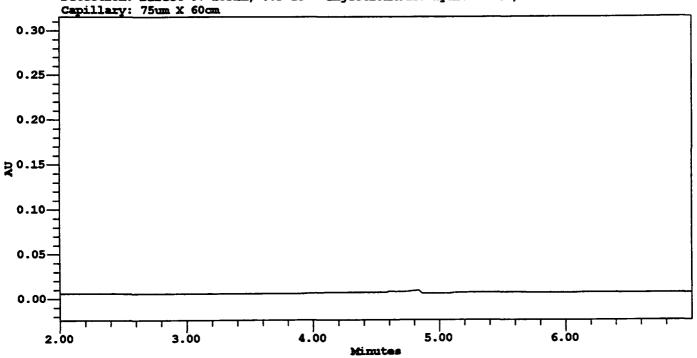


Table 'Peak Results' contains no data.

Millennium Results Report: HF MECC

Proc Chan: SATIN

For Sample: Int. Etch (0.02 Vial: 6 Inj: 1 Chan: SATIN

Date Processed 12/28/94 02:01:13 PM

Channel Descr: Direct UV

Northern Kentucky Laboratory Information Sample

Project Name:

CIA HF 01

SampleName:

Int. Etch (0.02-10mL)

Vial:

6

0.00

Injection:

1

Volume:

Hydrostatic Unknown

Channel:

SATIN

Run Time:

Sample Type:

8.0 min

Date Acquired:

12/28/94 01:26:20 PM

Date Processed:

12/28/94 02:01:13 PM

Scale Factor:

1.00

Dilution:

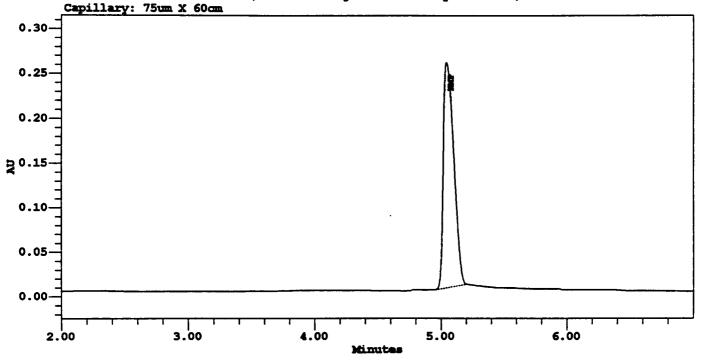
500.00000

Acq Meth Set: Processing Method:

CE_Control_MECC HF_MECC_01

SampleName: Int. Etch (0.02-10mL)

Electrolyte: 12.5 Boric Acid/2.5 NaBorate/50mM SDS RunVoltage: +20kV Detection: Direct UV 185mm, 0.3 TC InjectionMode: Hydrostatic, 30sec



Peak Results

#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)
1	NMP	5.078	1465806	288639.30	252715

Millennium Results Report: HF MECC

Proc Chan: SATIN

Page 1 of

For Sample: Final Etch (0.0 Vial: 7

Inj: 1 Chan: SATIN Date Processed 12/28/94 02:01:37 PM

Shannel Descr: Direct UV

Northern Kentucky Laboratory Sample Information

Project Name:

CIA HF 01

SampleName:

Final Etch (0.02-10mL)

Vial:

7

Injection:

Sample Type: Volume:

Hydrostatic Unknown

1

0.00

Channel:

SATIN

Run Time:

8.0 min

Date Acquired:

12/28/94 01:37:58 PM

Date Processed:

12/28/94 02:01:37 PM

Scale Factor:

1.00

Dilution:

500.00000

Acq Meth Set:

CE Control_MECC

Processing Method:

HF_MECC_01

SampleName: Final Etch (0.02-10mL)

Electrolyte: 12.5 Boric Acid/2.5 NaBorate/50mM SDS RunVoltage: +20kV Detection: Direct UV 185nm, 0.3 TC InjectionMode: Bydrostatic, 30sec

Capillary: 75um X 60cm 0.30-0.25 0.20 20.15 0.10 0.05 0.00 6.00 4.00 5.00 2.00 3.00 Minutes

Peak Results

#	Name	Migration Time (min)	Area (uV*sec)	Time Corr. Area	Height (uV)
1	NMP	4.975	1113166	223751.95	208249