950069

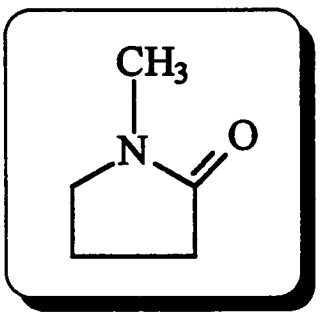
MILLENNIUM APPLICATION BRIEF

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

AUTHOR: Stuart Oehrle **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 NH_4F. 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.



NMP

EXPERIMENTAL:

MECC Analysis

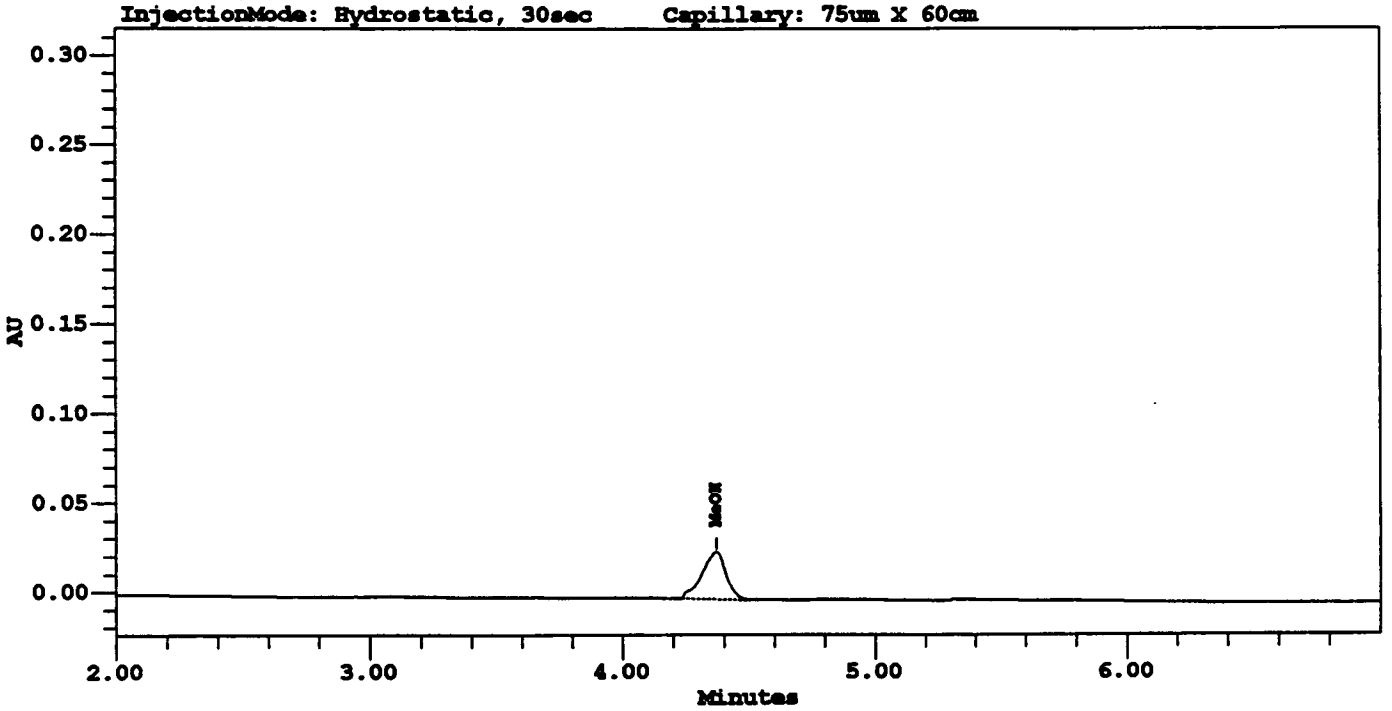
System:	Q4000E
Electrolyte:	Sodium borate/Boric acid/SDS
Capillary:	75um X 60cm
Injection:	Hydrostatic, 30 seconds
Run Voltage:	+20kV
Detection:	Indirect UV at 185nm
Data:	Millennium 2010 Chromatography Manager, Ver. 2.1 with CIA Option

FIGURES:

Northern Kentucky Laboratory
Sample Information

Project Name:	CIA_HF_01		
SampleName:	H2O/MeOH Blank		
Vial:	1	Sample Type:	Hydrostatic Unknown
Injection:	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:	CE_Control_MECC		
Processing Method:	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
InjectionMode: Hydrostatic, 30sec Capillary: 75um X 60cm

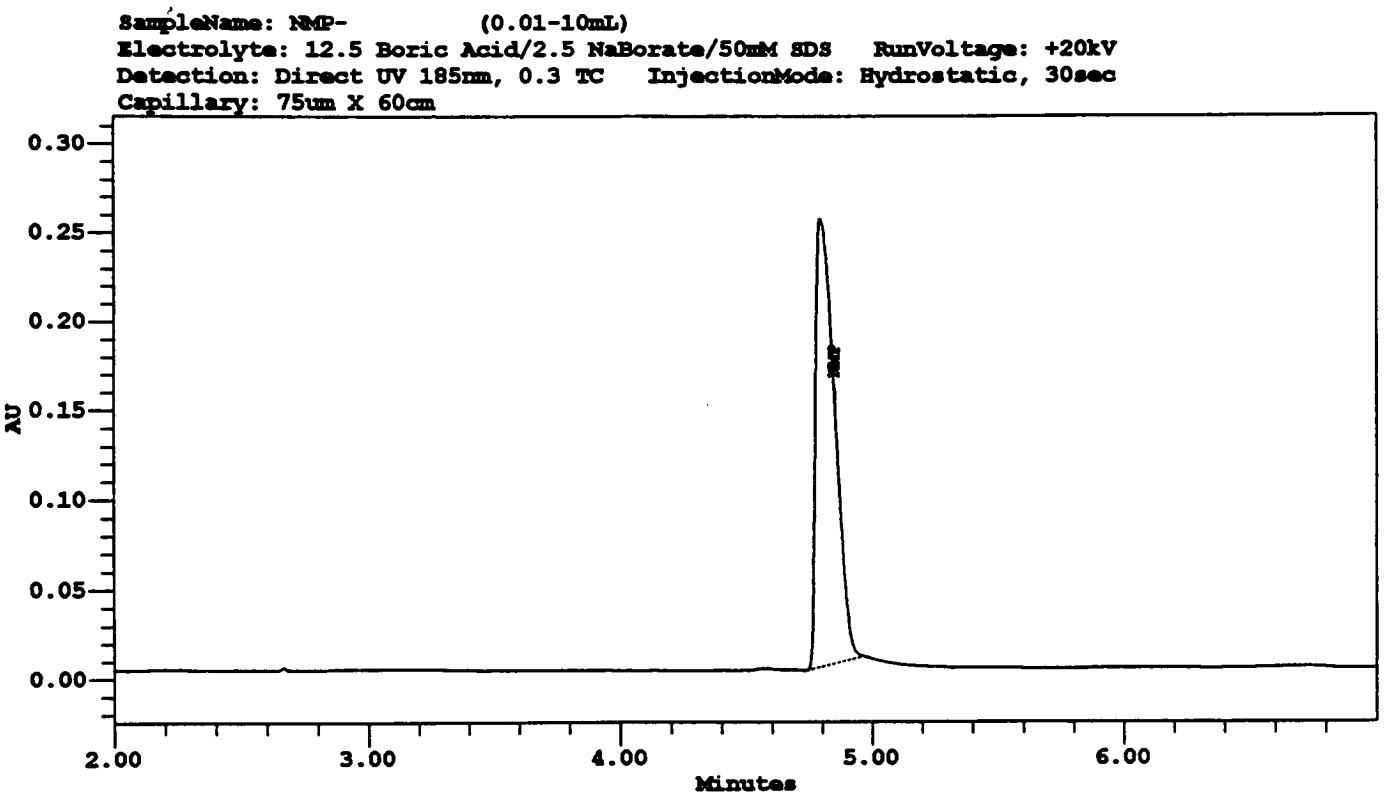


Peak Results

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

Northern Kentucky Laboratory
Sample Information

Project Name:	CIA_HF_01		
SampleName:	NMP- (0.01-10mL)		
Vial:	4	Sample Type:	Hydrostatic Unknown
Injection:	1	Volume:	0.00
Channel:	SATIN	Run Time:	8.0 min
Date Acquired:	12/28/94 01:03:03 PM	Date Processed:	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		



Peak Results

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

Northern Kentucky Laboratory
Sample Information

Project Name:	CIA_HF_01		
SampleName:	Quartz Etch (0.02-10mL)		
Vial:	5	Sample Type:	Hydrostatic Unknown
Injection:	1	Volume:	0.00
Channel:	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:	CE_Control_MECC		
Processing Method:	HF_MECC_01		

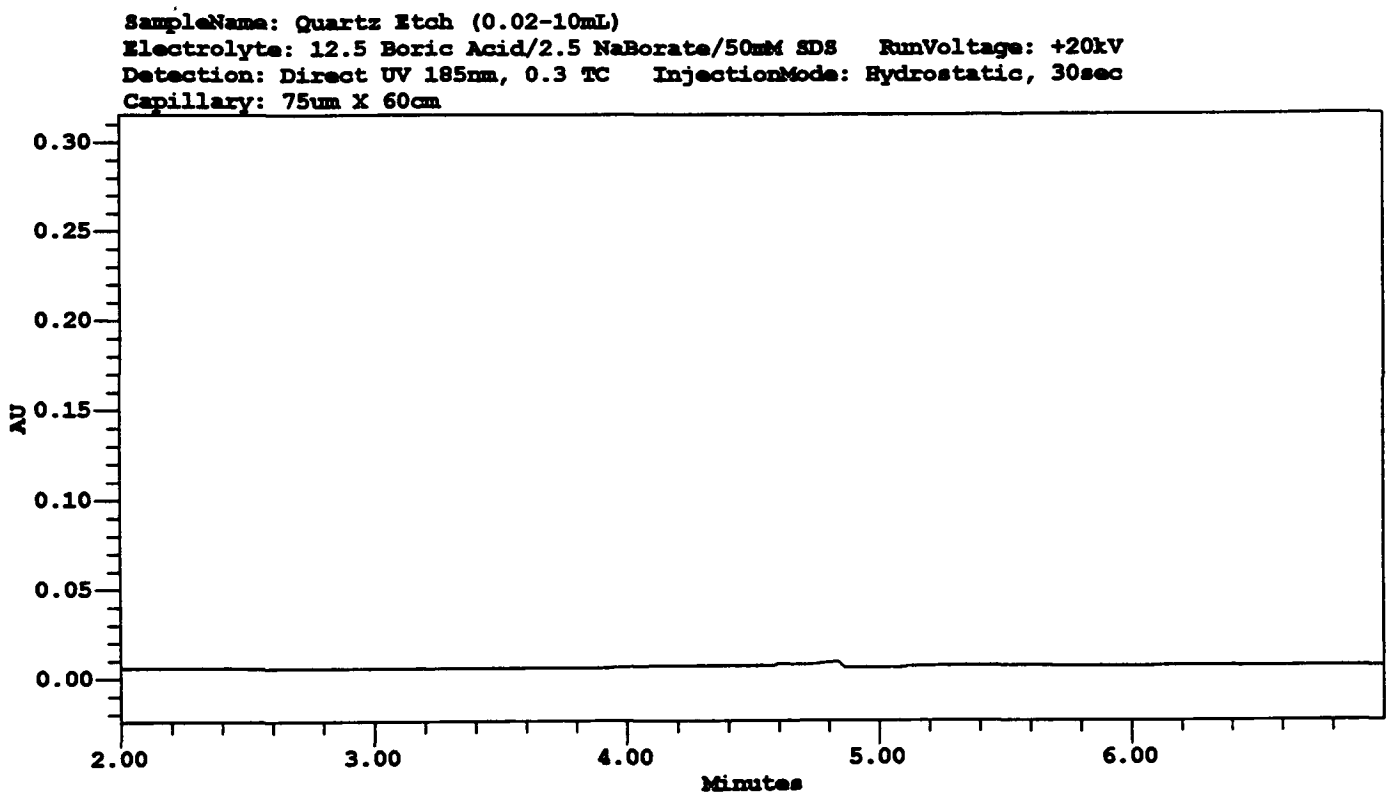
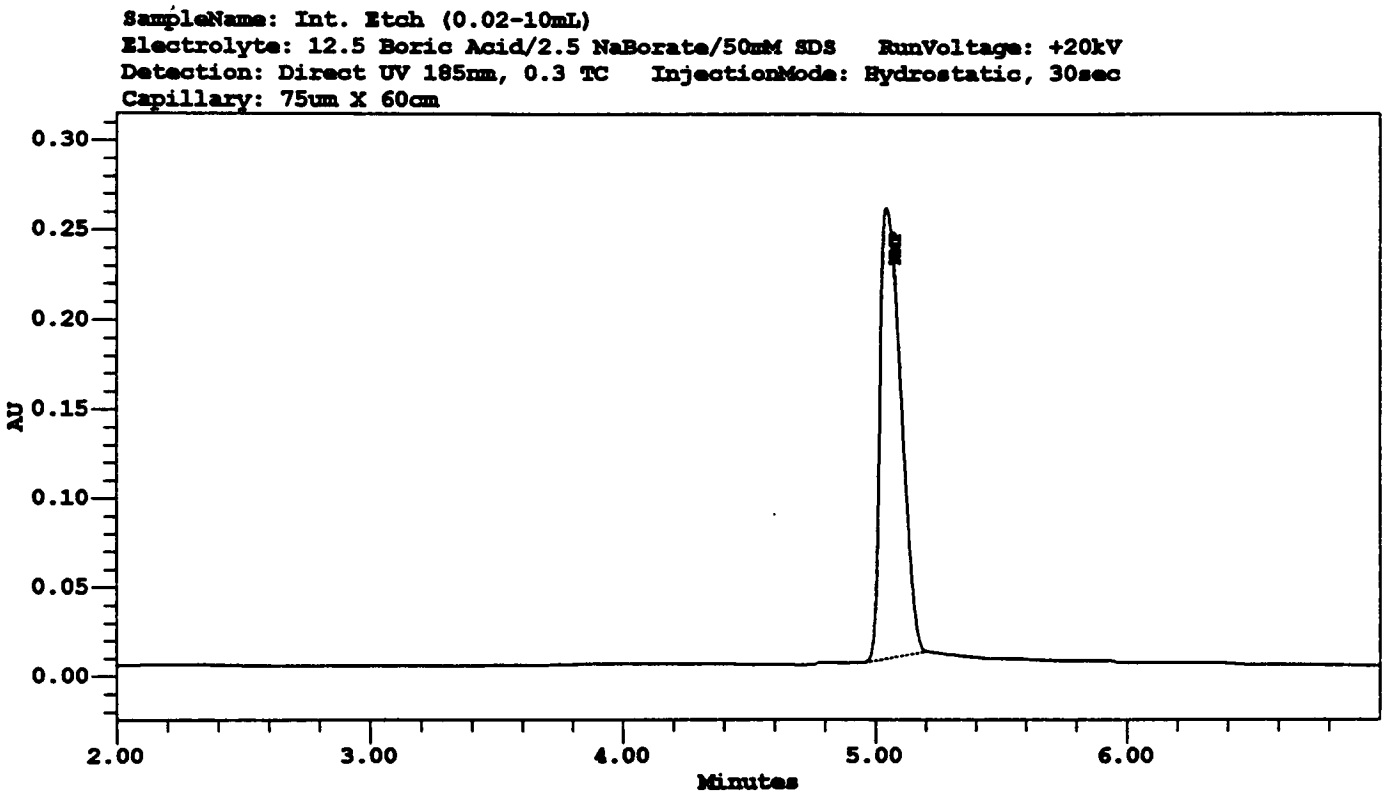


Table 'Peak Results' contains no data.

Northern Kentucky Laboratory
Sample Information

Project Name:	CIA_HF_01		
SampleName:	Int. Etch (0.02-10mL)		
Vial:	6	Sample Type:	Hydrostatic Unknown
Injection:	1	Volume:	0.00
Channel:	SATIN	Run Time:	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:	CE_Control_MECC		
Processing Method:	HF_MECC_01		



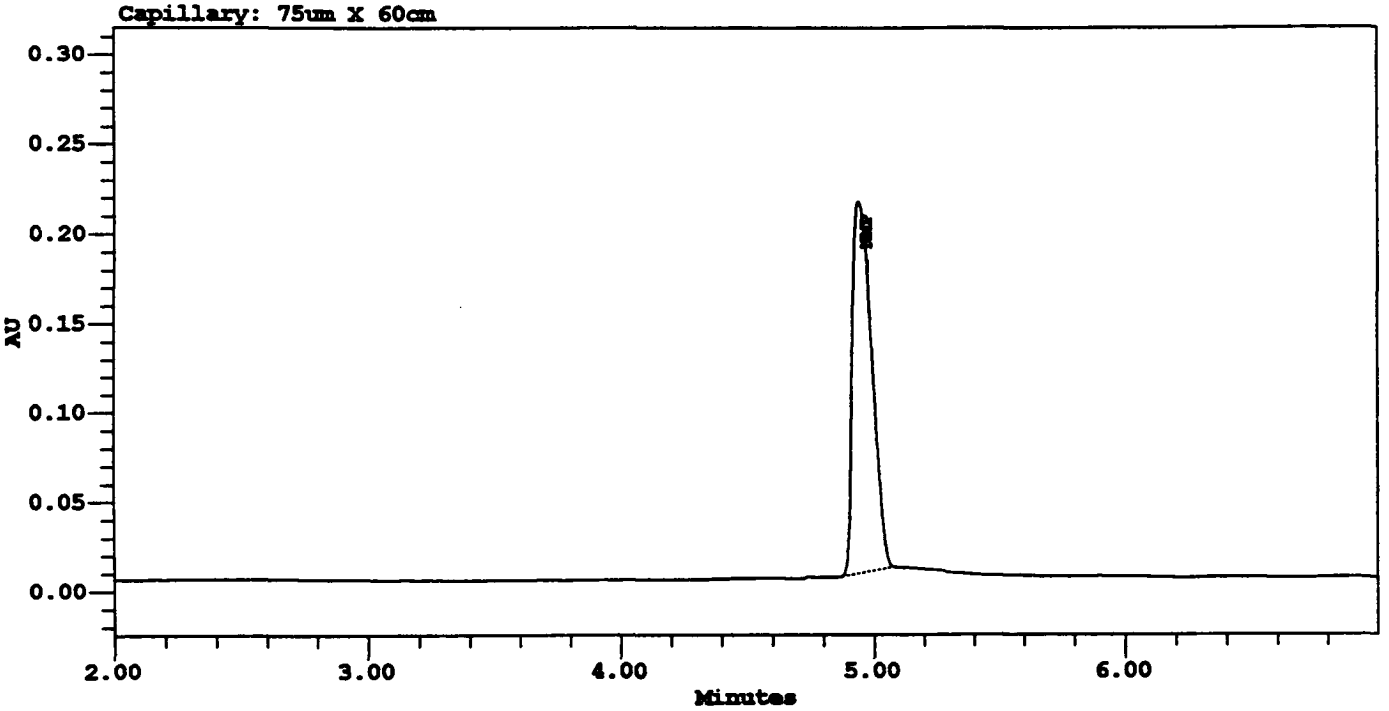
Peak Results

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

Northern Kentucky Laboratory
Sample Information

Project Name:	CIA_HF_01		
SampleName:	Final Etch (0.02-10mL)		
Vial:	7	Sample Type:	Hydrostatic Unknown
Injection:	1	Volume:	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: Hydrostatic, 30sec
Capillary: 75um X 60cm



Peak Results

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