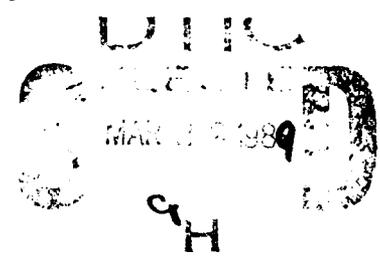


REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION		1b. RESTRICTIVE MARKINGS	
2a.		3. DISTRIBUTION/AVAILABILITY OF REPORT	
2b. <b>AD-A205 627</b>		Approved for public release; distribution unlimited.	
4. P.		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
		ARO 22536.5-CH	
6a. NAME OF PERFORMING ORGANIZATION	6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION	
University of Arizona		U. S. Army Research Office	
6c. ADDRESS (City, State, and ZIP Code)		7b. ADDRESS (City, State, and ZIP Code)	
University of Arizona Tucson AZ 85721		P. O. Box 12211 Research Triangle Park, NC 27709-2211	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
U. S. Army Research Office			
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS	
P. O. Box 12211 Research Triangle Park, NC 27709-2211		PROGRAM ELEMENT NO.	PROJECT NO.
		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification)			
Fabricable Polymers with Excellent Heat, Oxidative and Hydrolytic Stability			
12. PERSONAL AUTHOR(S)			
H.K. Hall, Jr.			
13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
final	FROM 5/1/85 TO 10/15/88	8-31-88	3
16. SUPPLEMENTARY NOTATION			
The view, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	polymerization, azaethylenes, azabutadienes	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
The study of extremely electrophilic imines was continued. Methyl dicyano-methanimine was synthesized and copolymerized with p-methoxy-styrene. The investigation of the polymerization of benzylidene cyanamide and pivalidene cyanamide was continued.			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT		21. ABSTRACT SECURITY CLASSIFICATION	
<input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL		22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
Dr. H.K. Hall, Jr.		602-621-6325	



Final Report to USARO

Proposal number 22536-CH

Period: 1 May 1985 - 15 Oct 1988

Author: H.K. Hall, Jr.

Chemistry Department

University of Arizona

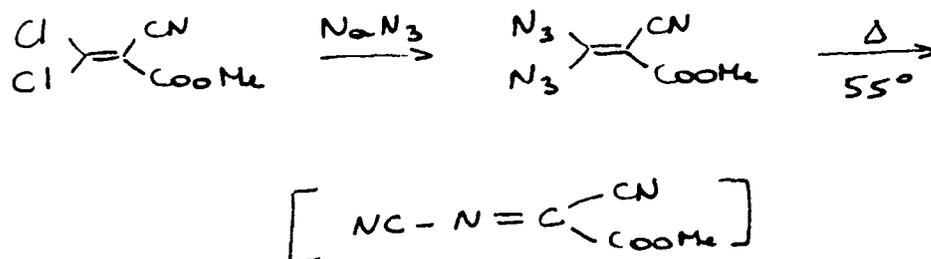
Tucson AZ 85721

Comment: This report had been submitted previously as a Progress Report. The moneys which were originally awarded to the late Dr. C.S. Marvel covered our research expenses for only this six-month period.

As agreed, the funds remaining from grant DAAG29-85-K-0110 were awarded to Dr. H. K. Hall, Jr. after the death of Dr. C. S. Marvel. These funds were used to continue the Principal Investigator's research on the "synthesis and Polymerization of Azaethylenes and Aza-1,3-Butadienes. New Reactive Monomers."

### Results

The study of extremely electrophilic imines was continued. In contrast to C=C and C=O monomers, the C=N monomers are conspicuous by their absence in the literature. Tricyano-azaethylene had previously been synthesized and proved to extremely reactive. Therefore, methyl dicyano-methanimine carboxylate has been synthesized by the same method.

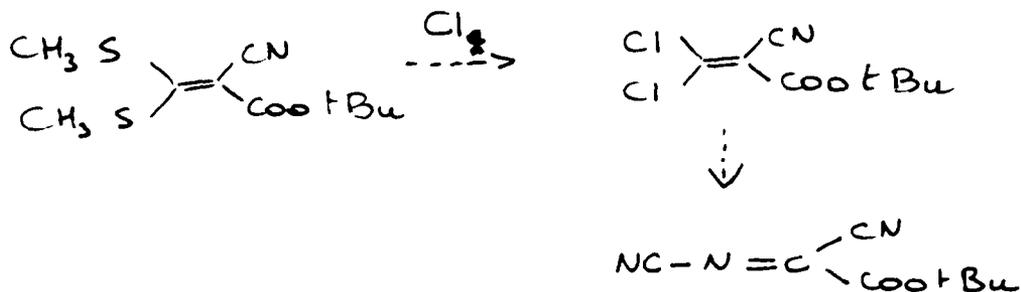


This monomer is more stable in solution and can be fully characterized. However, it cannot be isolated. Diels-Alder cycloadducts can be obtained with 2,3-dimethylbutadiene and cyclopentadiene. In the presence of p-methoxystyrene, spontaneous alternating copolymerization occurs, however this polymer was insoluble.

In order to improve stability and solubility, the t-butyl ester is now being synthesized.



A-1

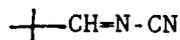


The chlorination step, in contrast to the methyl ester derivative, does not proceed in good yield and is currently being optimized.

We are also synthesizing the dibutyl and dimethyl N-cyanomethanimine dicarboxylate derivatives. These should be more stable, but hopefully still reactive enough to polymerize.



The investigation of the polymerization of benzylidene cyanamide and piralidene cyanamide was completed.



The former polymerizes in high yield both under anionic and free radical conditions, while the latter only polymerizes with anionic initiators.

Publications during this reporting period.

M. Ramezani, F.D. Saeva and H.K. Hall, Jr., "A New Azacyanocarbon, C<sub>4</sub>N<sub>4</sub>; Tricyanomethanimine," *Tetrah. Lett.* 29, 1235 (1988).

J.B. Kim and H.K. Hall, Jr., "Synthesis and Polymerization of 1-Carboethoxy-3-methyl-1-aza-1,3-butadiene," *Macromolecules* 21, 1547 (1988).

J.B. Kim, A.B. Padias, H.K. Hall, Jr. and F.D. Saeva. "Synthesis and Polymerization of Electron-Deficient Imines" (in preparation).

M. Ramezani, A.B. Padias and H.K. Hall, Jr., "Two Novel Electrophilic Imines" (in preparation).