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Journal Name:	International Research Journal of Pure and Applied Chemistry
Manuscript Number:	2014_IRJPAC_12002
Title of the Manuscript:	Matrix Isolation and Theoretical Study on the Photolysis of CH ₂ ClCOCl
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	Interesting paper, good conclusions are obtained from a suitable approach and provide clearly experimental data. After some general modification, this paper can be published. It would be desirable to indicate the usefulness of byproducts obtained after photolysis of CH_2ClCOCl The assessment of the process of photolysis is it positive while seeing the cost of Kr, Xe, Ar? If yes, it will be interesting to indicate in conclusion. There are essentially issues that must be clarified in the experimental details: 1) Initial concentration of Chloroacetyl chloride must be indicated, so more information on experimental conditions must be indicated. 2) A simple scheme of photolysis reactor will help to understand the set up. Authors used the O_2 matrix to explain the mechanism of photolysis which is concerted reaction. However, the explanation seems to be poor according to me. I would like to recommend authors to draw a scheme to illustrate the mechanism of CH_2Cl_2 formation for example?	The authors appreciate reviewer's valuable comments. The authors would not like to add comment concerning the usefulness of byproducts because this paper focuses on the photolysis not synthesis. The authors do not fully understand the comment. Fig. 6 was added to explain the matrix effect. 1) A sentence "Sample was diluted with a matrix gas to approximately 1/1000 (0.2 Torr sample and 200 Torr matrix gas) and was deposited on a CsI window at 6 K" was added in experimental section 2) This is not the first paper where this matrix isolation system was used. So, only brief explanation was given. To emphasize the ketene formation in O_2, Fig. 5 was altered from the spectrum measured after 420 min irradiation to that measured after 60 min irradiation. Fig. 7 was added to compare the energy differences in the reaction paths. Generally, changing matrix gas affects the cage size,



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	It will be interesting to precise why the byproducts are different in Ar matrix to Xe and Kr matrices! The role of atmosphere? In O₂ matrix, they have observed the formation of O₃ which is known to be a strong oxidant! What about the rate of chloracetylene chloride decomposition after its formation? Ozone does not have effect?	polarizability and spin-orbit interaction. Integrated absorbance changes of <i>anti</i>-CH₂ClCOCl (at 1826 cm⁻¹) and ozone (at 1036 cm⁻¹) were plotted below. A decay curve of <i>anti</i>-CH₂ClCOCl was well fitted by the single exponential function. Significant effect was not found. Using the calculated IR intensities of 235 (ozone, 1036 cm⁻¹) and 263 (<i>anti</i>-CH₂ClCOCl, 1826 cm⁻¹) km mol⁻¹, the ratio of O₃/O₂ at the time of 420 min was approximately estimated to be 7.4×10⁻⁵.
Minor REVISION comments	Line 28 to line 32: this sentence is too long. I suggest to partition in order to be clearer.	As suggested, this sentence was split into two sentences.
Optional/General comments		