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High Temperature Raman Spectroscopy Study of the Conversion of Formate into Oxalate: Search for the Elusive CO_2^{2-} Intermediate CHARLES RYAN, ANNA MEAD, PRASAD LAKKARAJU, Georgian Court University, Dept. of Chemistry, JERRY KACZUR, Liquid Light Chemical Corp., CHRISTOPHER BENNETT[1], TABBETHA DOBBINS, Rowan University, Dept. of Physics Astronomy — Research on conversion of carbon dioxide into chemicals and fuels has the potential to address three problems of global relevance. (a) By removing carbon dioxide from the atmosphere, we are able to reduce the amount of greenhouse gases in the atmosphere, (b) by converting carbon dioxide into fuels, we are providing pathways for renewable energy sources, (c) by converting carbon dioxide into C2 and higher order compounds, and we are able to generate valuable precursors for organic synthesis. Formate salts are formed by the electrochemical reduction of carbon dioxide in aqueous media. However, in order to increase the utilization of carbon dioxide, methods need to be developed for the conversion of formate into compounds containing two carbon atoms such as oxalate or oxalic acid. Recently, we examined the thermal conversion of sodium formate into sodium oxalate utilizing a hydride ion catalyst. The proposed mechanism for this reaction involves the carbon dioxide dianion.

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