I/UCRC Executive Summary - Project Synopsis	**Date**: March 24, 2018

Center/Site: CANFSA/Colorado School of Mines

Tracking No.: 28-L Laboratory Testing to Identify Permanent PVD Coatings to Minimize Lubricant Use During Forging	**Phone :** (303) 384-2301	**E-mail :** kehe@mines.edu

Center/Site Director: M. Kaufman/P. Collins/A. Clarke	**Type: (Continuing)**
Project Leader: Trevor Kehe (UG researcher)	**Proposed Budget**: $ 40,000

Project Description: CANSFA is working to identify how a different coating on open faced dies affects the friction associated with forging operations for given materials. These coatings will be placed on open dies using physical vapor deposition (PVD), and other techniques. In order to test different coatings, a modified open die system will be required where multiple replaceable faces/surfaces for the dies with different and unique PVD coatings on each face can be tested.

Experimental plan: Design and manufacture a set of forging dies with capability to have PVD coatings applied and can be used at temperatures up to 400°C. Use these dies to perform ring forging tests with various materials to measure frictions conditions.

Related work elsewhere: Previous work in PVD coatings have been performed in the late 1990s and before.

How this project is different: Current PVD technologies have created new coatings that might improve performance.

Milestones for the current proposed year: Produce forging dies, coat die inserts with various PVD coatings, and perform friction testing.

Deliverables for the current proposed year: Completed forging dies, testing, and final report.

How the project may be transformative and/or benefit society: Creating forging dies with lower friction will allow for longer service duration, faster production, and the potential to produce parts that were not previously possible, transforming manufacturing capabilities.

Research areas of expertise needed for project success: Metallurgical engineering, PVD coatings, forging, die manufacture.

Potential Member Company Benefits: Advanced forging die technologies.

Progress to Date: Dies have been designed and are being manufactured.

Estimated Start Date: Spring 2017	**Estimated Knowledge Transfer Date**: Fall 2018