Section 3. Task 2 Results of a Ceramics Informatics Workshop

3.1 Workshop Logistics

As part of this study, the *Workshop on E-Ceramics: Prospects and Challenges for Improved Access to Ceramics Property Data*, was held in the Virginia Tech Research Center in Arlington, Virginia, on June 4th and 5th, 2012. The workshop focused on the prospects and challenges for improved access to, and quality of, ceramic property data. The goal of the workshop was to determine whether the needs of industry, government laboratories, and academia for electronic access to ceramic property data are being met, and if not, what actions are needed to meet those needs.

The workshop was held free of charge, by invitation. Some of the topics discussed are as follows:

- Materials as a Key Defense Strategy
- Ceramics Databases: A Review
- Ceramics Data in Asia: A Review of Approaches
- New Approaches to Data: The Materials Genome Initiative
- Scientific Data and Social Media: Thoughts for the Future
- What are current requirements for improved access to ceramic property data?
- Which needs are unmet and which needs are most critical?
- Are people willing to pay for improved access?
- What actions are required? Who should take action? How should they be supported?

3.2 Workshop Attendees

The workshop was designed to obtain information from the user community, especially from those who have a real need for access to the latest and best data. As a result, of the thirty attendees, 14 were from industry, 14 from government laboratories and materials organizations, and 2 from academia. Attendees' names and institutions are listed below in Table 3-1.

Table 3-1, Attendees at E-Ceramics 2012.

Name	***Organization***
Industry	
Todd Steyer	Boeing Aircraft
Gary Fishman	Industrial Consultant
Alex Coletti	SM Resources Corporation

Table 3-1, Attendees at E-Ceramics 2012.	
Name	***Organization***
Eileen DeGuire	American Ceramic Society
Steve Freiman	Freiman Consulting
Sharon George	Springer
John Holowczak	United Technologies Research Center
Arne Knudsen	Kyocera America
Toni Marechaux	Strategic Analysis
Charles Spahr	American Ceramic Society
Karen Cavallo Miller	Information International Associates
Lora Cooper Rothen	DUCO Services
John Rumble	R & R Data Services
Alan Raynes	Konrad, Raynes, & Victor
Government Laboratories and Agencies	
Matthew Bratcher	US Army Research Laboratory
Kevin Ewsuk	Sandia National Laboratory
Jeffrey Fong	NIST
Terrell Vanderah	NIST
James Warren	NIST
Eric Wuchina	NSWC
Randy Hay	Air Force Research Laboratory
Ken Lipkowitz	Office of Naval Research
Lynette Madsen	National Science Foundation
Suveen Mathaudhu	US Army Research Office

Table 3-1, Attendees at E-Ceramics 2012.	
Name	***Organization***
James McCauley	US Army Research Laboratory
J. P. Singh	US Army Research Laboratory
Lew Sloter	DoD OASD (R&E)
David Stepp	US Army Research Office
Universities	
Laura Bartolo	Kent State University
Jim Shackelford	UC Davis

In addition to the invited talks, considerable time was allotted for group discussion, which has been summarized below.

3.3 Workshop Discussion and Conclusions

Following the daily presentations each day, roundtable discussions were held with all attendees to give all participants a chance to express their thoughts and to identify important issues that should be addressed by the ceramics data community. Major points identified included the following:

- The database of ceramics databases that has been compiled under this study and described at the workshop should be made available to organizations such as the American Ceramic Society, ASM International, and any other group that desires it to be freely available to the general public.
- A concerted effort is needed to build a high quality database of fundamental properties of single crystals to support atomistic scale modeling. Needed data include elastic constants, electrical constants, and other data regarding similar properties. The database should be freely available and should be capable of supporting FEM and other modeling techniques.
- Work should restart on establishing metadata guidelines for ceramic property data. This work could be done under the auspices of ASTM C28 on Advanced Ceramics.
- Organizations such as NIST and the American Ceramic Society should solicit ideas from the ceramics community as to the need for new data evaluation projects for ceramic property data, including performance data. This includes the possible update of the NIST Ceramics WebBook, as well as update and production of electronic classical print data compilations.

- Given the number and diversity of existing ceramic databases, organizations such as the American Ceramic Society should explore establishing a ceramics data portal that provides a single point of access to as many ceramics data resources as possible. The data portal should include visualization and other tools, as well as a comprehensive directory of content.
- Access to publicly available data is important for ceramics users and producers, as those data allow optimization to local needs.
- International Traffic in Arms Regulations (ITAR) restrictions in some cases limit sharing of data on advanced materials, especially ceramic matrix composites.
- Journals should provide access to data tables and even the raw data behind tables in their articles through data repositories that could be built and maintained by the journals themselves, by professional societies, or by other organizations, similar to the data repositories operated by crystallographic data centers.
- There should be a continuing series of materials data workshops and conferences to provide for the exchange of knowledge and fostering of progress in this area.