



Exceptional service in the national interest

# Cosmetic Chemistry

Presented by

Danae Davis

Jessica Kruichak

Leslie Munyao

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# Nice to meet you!

## Leslie Munyao

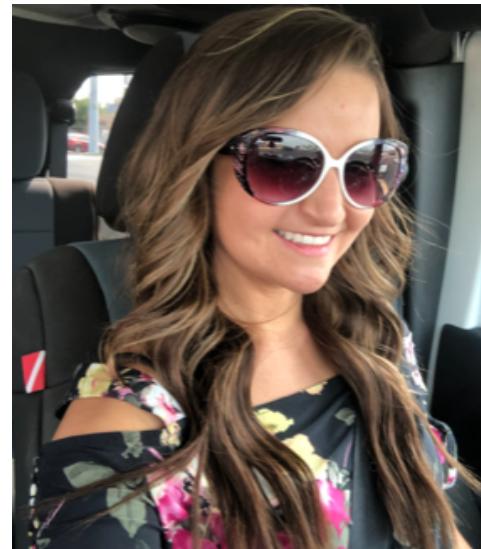


B.S Mechanical Engineering, Cornell University, 2016

M.Eng Systems Engineering, Cornell University, 2017

Leslie has been a staff member at Sandia National Laboratories (SNL) for 6 years. She has worked in various engineering roles in the Neutron Generator Enterprise (NGE) including production component engineering. Currently, she works as a systems analyst and gets to investigate and learn about different work and projects at SNL.

## Jessica Kruichak



B.A. Chemistry and B.S. Biology, University of New Mexico, 2011

M.S. Chemistry, University of New Mexico, 2013

Jessica has been a staff member at Sandia National Laboratories for 8 years, working in the field of nuclear waste disposal research and analysis. She also manages chemistry and radioactive material laboratories. From time to time she gets to work on small business projects in which she has done beer/coffee liquid nitrogen; hand sanitizer; and 3D clay printing experiments for local small businesses.

## Danae Davis



B.A. Chemistry, University of New Mexico, 2011  
M.S. Chemistry, University of New Mexico, 2013

Danae has been a staff member at Sandia National Laboratories for 8 years, working on a variety of projects ranging from nanomaterials synthesis to component engineering. She enjoys being a part of multidisciplinary teams and taking on new challenges. She recently moved into a new position working on radar systems.



# Leslie's STEM Journey

2014/2015  
Co-op as a  
Mechanical  
Systems Engineer  
at Space Systems  
Loral

2016 Spring  
Graduate with  
B.S in  
Mechanical  
Engineering

2016 Summer  
Masters Fellowship  
Program (MFP)  
Student at SNL

2017 January  
Graduate with  
M.Eng in  
Systems  
Engineering

2017 January  
Engineer in the  
Neutron  
Generator  
Enterprise at  
SNL

2021 August  
Systems Analyst  
at SNL



I am passionate about  
volunteering in women in  
STEM activities

**SPACE SYSTEMS  
LORAL**



**Sandia  
National  
Laboratories**

Experience in mechanical  
systems engineering,  
product engineering, and  
systems analysis



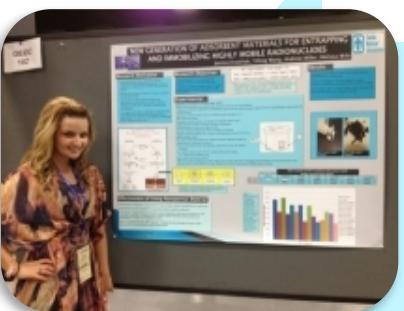


# Jessica's STEM Journey



## Bachelor of Science Biology & Chemistry

- Lab assistant-leukemia research (2007-2008) UNM Cancer Center
- Lab Assistant-ovarian cancer research (2008-2009) UNM College of Pharmacy
- Student Intern-Sandia National Labs (2009-2011)



THE UNIVERSITY of  
NEW MEXICO



## Master's Chemistry

- Graduate student intern Sandia National Labs (2012-2013)

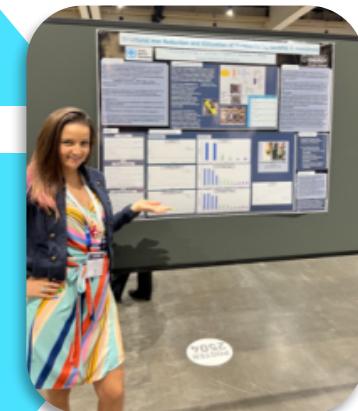


Sandia  
National  
Laboratories

## Geosciences Engineer

Sandia National  
Labs  
(2014-present)  
Nuclear Waste  
Disposal  
Research and  
Analysis

- Chemistry lab/material synthesis and characterization
- 6 published papers and 3 patents





# Danae's STEM Journey...so far!



## Experience in...

- Chemistry & Materials Science
- Systems Engineering
- Component Manufacturing

## Motivated by...

- Being a lifelong learner
- Empowering others
- Making things better

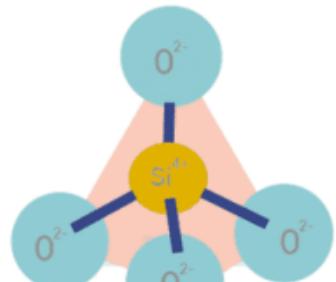




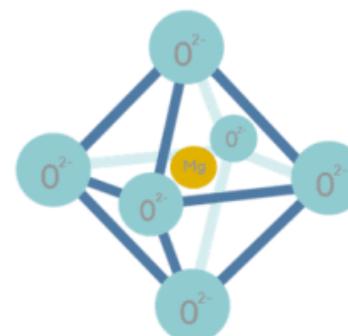
# Chemistry in Action! | The Chemistry of Clay Minerals

Talk about clay minerals and how many there and applications....

Silica tetrahedron

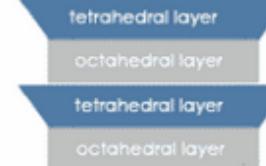


Al/Mg octahedron

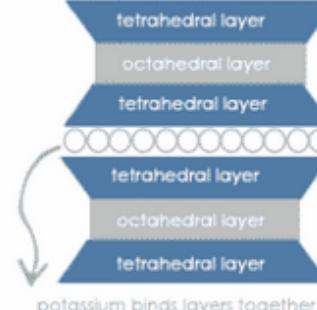


Bentonite- 2:1 structure  
Illite- 2:1 Structure  
Kaolinite- 1:1 Structure

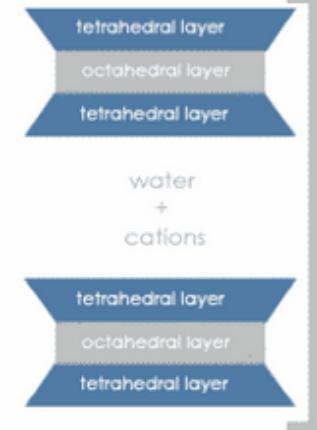
1:1 Kaolinte  
non-swelling  
(kaolin clay)



2:1 Illite  
non-swelling  
(french green clay)



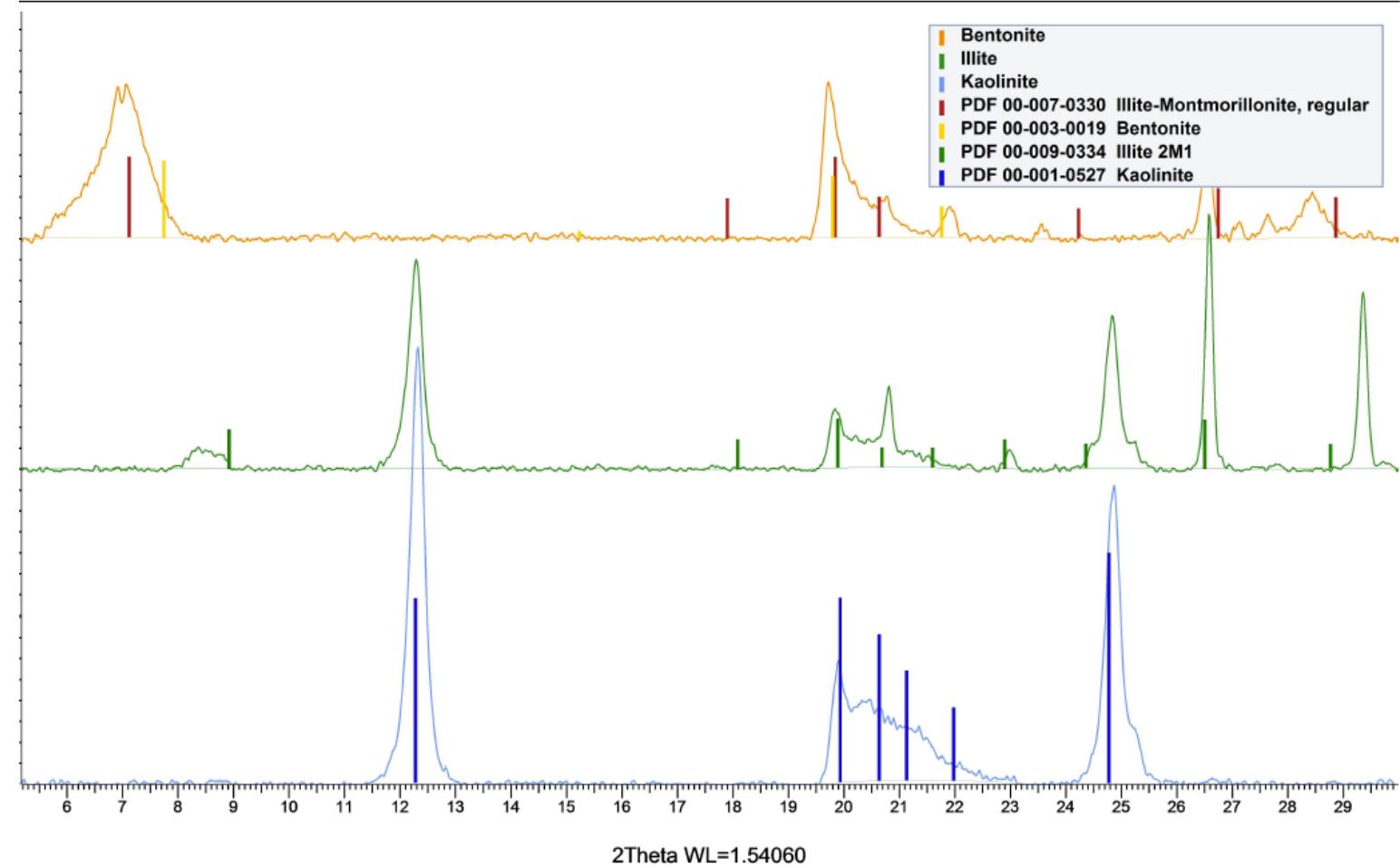
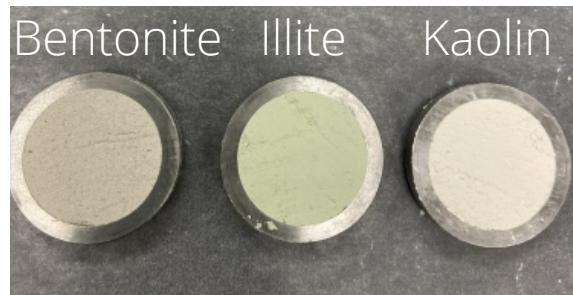
2:1 Smectite  
highly expansive  
(bentonite, rhassoul)



Clay Minerals Swelling Capability  
[facialclaymasks.com](http://facialclaymasks.com)



# X-Ray Diffraction



# Chemistry in Action! | Clay Application- Clay Masks

There are many types of clays that can be used as face masks; the crystal structure and mineral composition vary which gives you the ability to choose what is the best clay for your type of skin.

We have provided you with 3 clays:

- **Bentonite** is used to remove impurities on the skin such as dirt, oils and toxins.
- **French Green** is effective in absorbing excess oil and purifying the skin.
- **Kaolin** is gentle and most suitable for sensitive (or dry skin) less oil-absorbent.

## Procedure

- Add 1 TBS of choice clay to small mixing bowl provided
- Add liquid to clay
- 2-3 TBS of apple cider vinegar to **Bentonite Clay**
- 1 TBS of apple cider vinegar to **French Green Clay**
- 1 TSP of water to **Kaolin Clay**
- Mix well using a plastic spoon or spatula
- Apply to the face:
  - For the **Bentonite** use the back of a plastic spoon or spatula (thick mixture)
  - For the **Kaolin** and **French Green** use, the provided application brush
- Let sit and dry for 10-15 minutes
- Rinse with warm water
- Use once a week





## Chemistry in Action! | Bath Bombs

### Dry Ingredients

Baking soda (1/2 c.)

Citric acid (1/4 c.)

Epsom salt (1/4 c.)

Corn starch (1/4 c.)

### Liquid Ingredients

Coconut oil (4 tsp.)

Essential oil

Soap dye

Water (1 Tbsp.)

### Other Supplies

Mixing bowl

Tablespoon and teaspoon

Small cup



## Chemistry in Action! | Bath Bombs

1. Combine dry ingredients; mix well.
2. Combine liquid ingredients in a small cup; mix well.
3. *Slowly* add liquids to dry ingredients.

***What do you observe?***

4. Mix well until a thick and even consistency is attained.
5. Pack tightly into both sides of the mold.
6. Press the two sides together.
7. Let dry overnight!

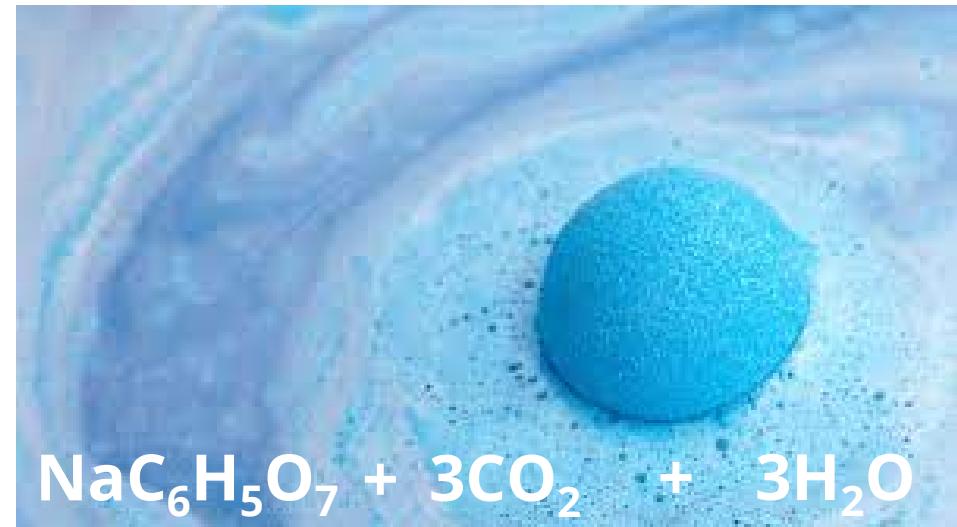
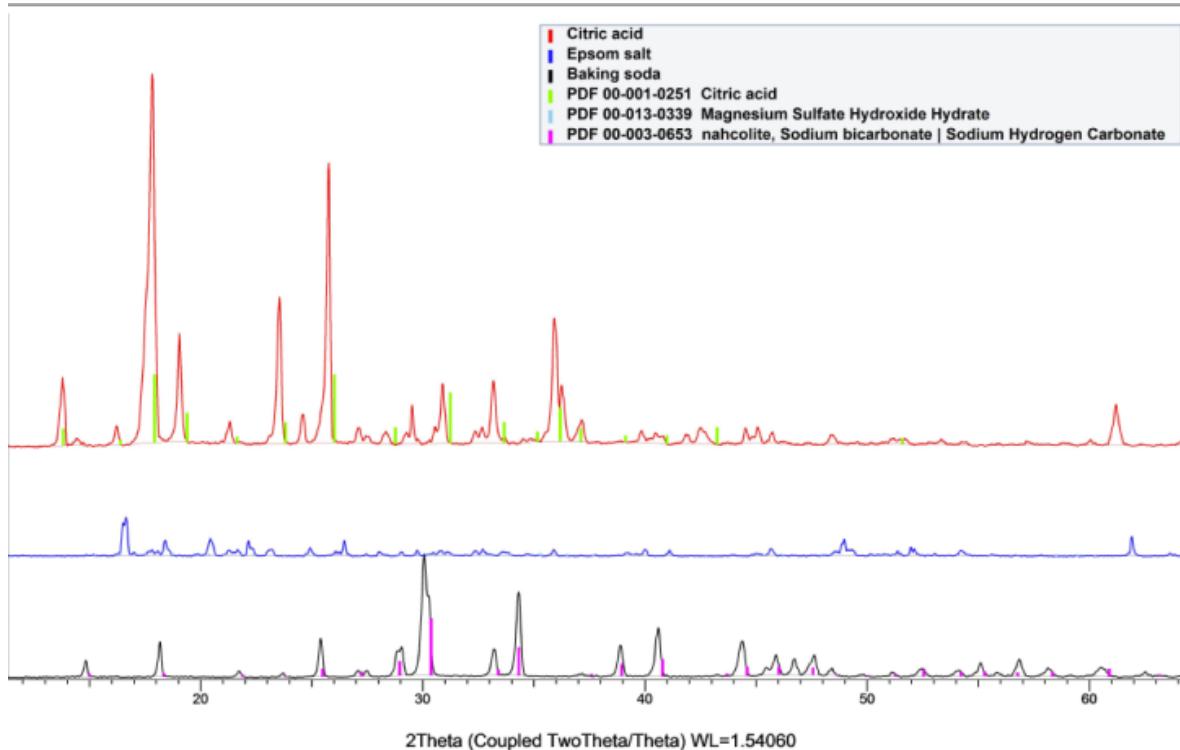


## Chemistry in Action! | Bath Bombs

Sodium bicarbonate + Citric acid →

$3\text{NaHCO}_3$  +  $\text{C}_6\text{H}_8\text{O}_7$  →

White powders- Which is which??



Sodium citrate + Carbon Dioxide + Water



Questions?