

	Environmental Analysis Teaching and Research Laboratory	Date: 8/11/2016	Number: 35
	Standard Operating Procedure	Title: Analysis of Soil Pb	
	Approved By: Los Huertos	Revision Date: April 4, 2017	

1. Scope and Application

1.1 Hello, here is some text without a meaning. This text should show, how a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like ■Huardest gefburn■? Kjift – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for a special contents, but the length of words should match to the language.

1.2 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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2. Health and Safety

2.1 Observe the safety instructions. Not following these instructions can cause damage

2.2 The spectrophotometer is to be used for its intended use only. Improper use can cause damages, contamination, and injuries with fatal consequences.

3. Personnel & Training Responsibilities

3.1 Researchers training is required before this the procedures in this method can be used...

3.2 Researchers using this SOP should be trained for the following SOPs:

- SOP01 Laboratory Safety
- SOP02 Field Safety

4. Preparation

4.1. Supplies and Equipment

- Mason jar with screw lids -(Not using thisâ€œtoo messy?) OR
- Mesh sieves -(Sizes: No.10; Locations: entry room of the lab; Cabinet: Ziploc Bags & Notebooks) total amount: 4
- balance -(Mettler Toledo Precision Balance, Model MS1602TS, Made in Switzerland,on the side table)
- 25433-008 VWR 60 mL Disposable Aluminum Crinkle Dishes with Tabs 332.60 dollars
VWR Disposable Aluminum Crinkle Dishes with Tabs
- Fisherbrand 25mm syringe filter 0.45 um, Cat no 09-719D MF-Millipore Membrane Filters
- Centrifuge tubes (whatever used at Keck)
- Tongs -(Cabinet 9: Mattle Tins, Plastic Bottle)
- Hot plate -(Thermo Scientific Cimarec S88857104 Stirrer, 7x7" Aluminum; 120 VAC, Assembled in China, inside the Fumehoods)
- Funnel -(64mm, 10500, 12PK, Made in Mexico, The White table with water sinks; the top drawer by the wall)
- Glass wool -(ran out); CAS Number 65997-17-3 Sigma Aldrich Catalog

- 100ml volumetric flask- (Back cabinet: volumetric flasks & graduated cylinders; there are 17)
- Stop watches
- Gloves
- 250ml Erlenmeyer Flask- (Back cabinet: erlenmeyer flasks & beakers; there are 21)

4.2. Reagents

- Nitric acid

5. Estimated Time

5.1 This will take 120 minutes?

6. Procedure

6.1 Part II: Determination of Lead levels using Atomic absorption spectroscopy

You must wear safety goggles or eyeglasses Plastic Gloves are available to protect your hands from acid. Wash off any acid, even on the gloves.

- A. Preparation of the soil samples:
 - 1. From the Mason jar with mesh on top, sieve approximately 10.0 g soil on to the plastic weighing dish.
 - 2. Transfer all the weighed soil to a 250-mL erlenmeyer (conical shaped flask). Label the flask with your initials on label tape.
- B. Extracting the Lead:
 - 3. In the fume hood - Add 20 mL of 1M nitric acid CAREFULLY (slowly) to the soil.
 - 4. Heat the mixture near boiling on the hot plate (medium setting) until the fumes are almost colorless. Heat for 5 -10 additional min. Do not let the mixture go dry - add a few mLs of water if needed. At end, with tongs, remove flask from plate, and cool 5-10 min. Then take back to bench.
 - 5. CAREFULLY add 75 mL of deionized water to the flask and swirl GENTLY. Let stand 3-5 min so heavier particles can settle out.
 - 6. Take a funnel and put a small wad of glass wool in the funnel and place the funnel in a 100-mL volumetric flask. Label this flask with your initials on tape.
 - 7. Carefully transfer the acid/soil solution from the conical flask to the volumetric flask. You will not remove all the soil particles, but most of the larger ones will be filtered out.

- 8. Fill the volumetric flask to the circular mark on the neck with deionized water. Mix well by putting your thumb over the stopper and inverting the flask several times. Let stand several minutes to allow soil to settle down. Slowly pour 15 mL of the water at the top of the volumetric flask into the centrifuge tube to take over the KSD main building.
 - * SO get centrifuge tubes and then move them to Keck? How are we going to store the tubes if necessary? How are we moving the tubes to Keck? Could it be better to do the whole thing at Keck?
- C. Calibrating Solutions:
 - 9. Blank Solutions: Blank Solutions Explanation
 - 10. Standard Solutions: Standard Solutions Explanation
 - 11. Spiked Solutions: Spiked Solutions Explanation
- D. Determining the lead content:
 - 12. Centrifuge a 15-mL sample until solution is clear. Usually 3 to 4 min. Use a syringe and Millipore filter to push (gently) about 10 mL of solution through the filter into the small labeled sample vial.
 - 13. Measure the concentration of the solution on the Atomic Adsorption Spectrometer. Multiply the reading for your sample by 10 to calculate the lead concentration in your soil sample. The final result is in $\mu\text{g/L}$, which means milligrams (0.0010 g) of lead per kilogram of soil.
- E. Dispose of sample and solutions as directed by instructors. Clean up your bench space.

7. References

- 7.1** APHA, AWWA, WEF. (2012) Standard Methods for examination of water and wastewater. 22nd American Public Health Association (Eds.). Washington. 1360 pp. (2014).
- 7.2** Glass Wool 18421. 2017. Sigma-Aldrich. Accessed April 4. Sigma Aldrich.
- 7.3** VWR Disposable Aluminum Crinkle Dishes with Tabs | VWR. 2017. Accessed April 4. VWR.
- 7.4** MF-Millipore Membrane Filters - Filter Discs and Membranes. 2017. Accessed April 4. Filters.
- 7.5** Analytical Methods for Atomic Absorption Spectroscopy Methods for AA Spectroscopy
- 7.6** Concepts; Instrumentation and Techniques in Atomic Absorption Spectrophotometry Techniques in AA Spectrophotometer