MJPHD

MICROPLASTICS:
WHAT ARE THEY AND WHERE ARE THEY

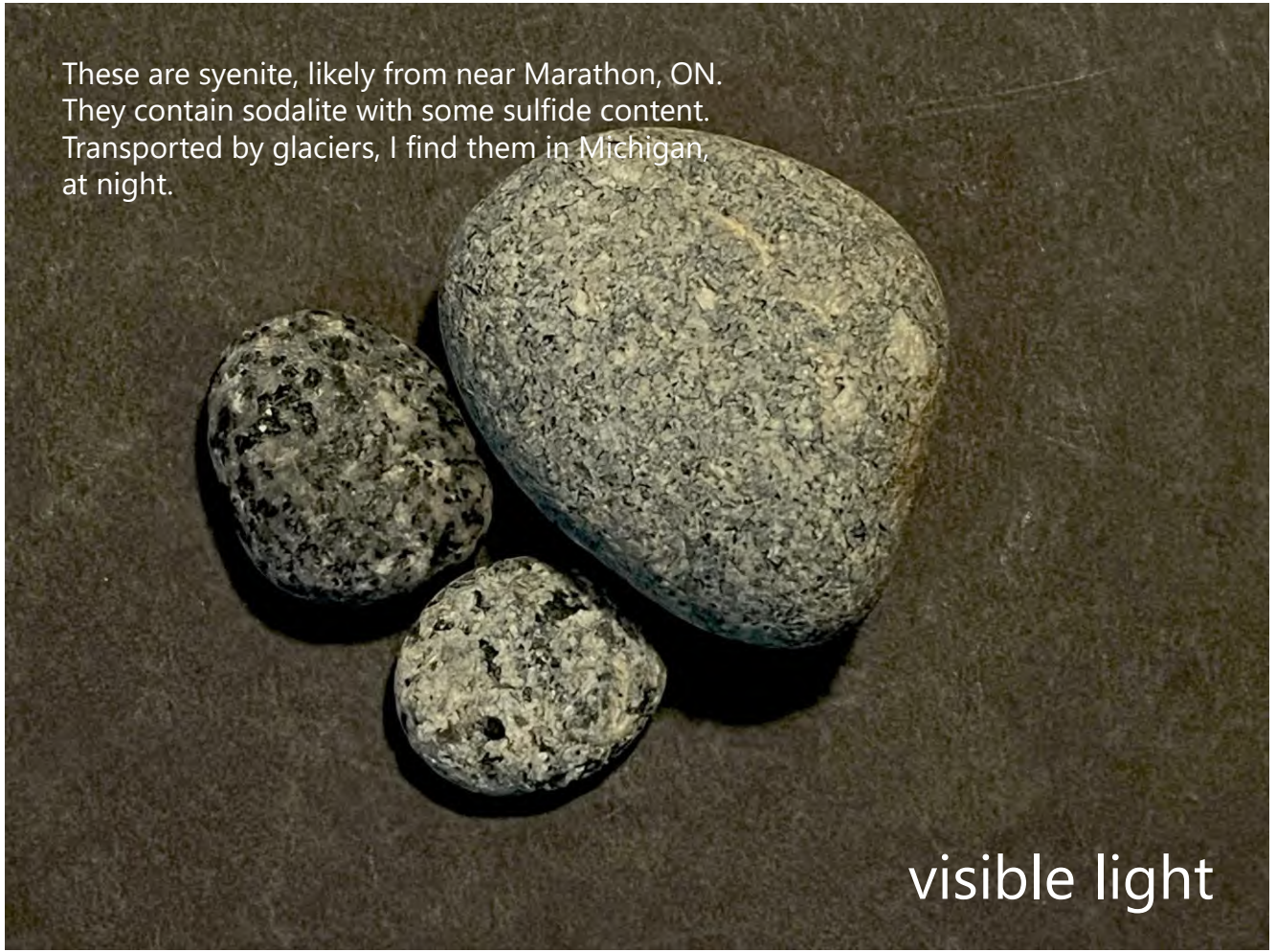
MARK JONES
CREATIVE DIRECTOR
MJPHD, LLC

5 March 2025

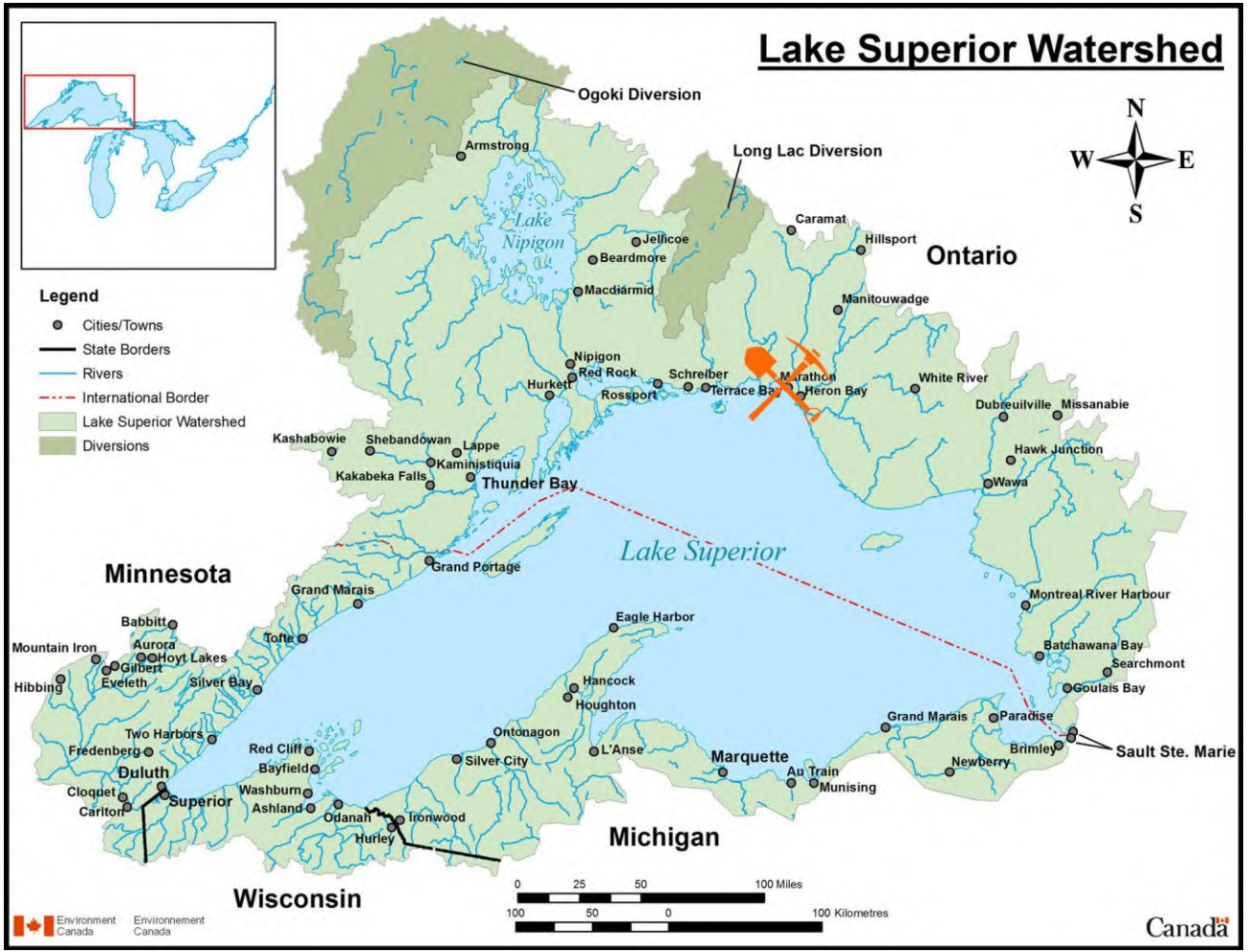
Yooperlites and that using different light to view the world can illuminate new things

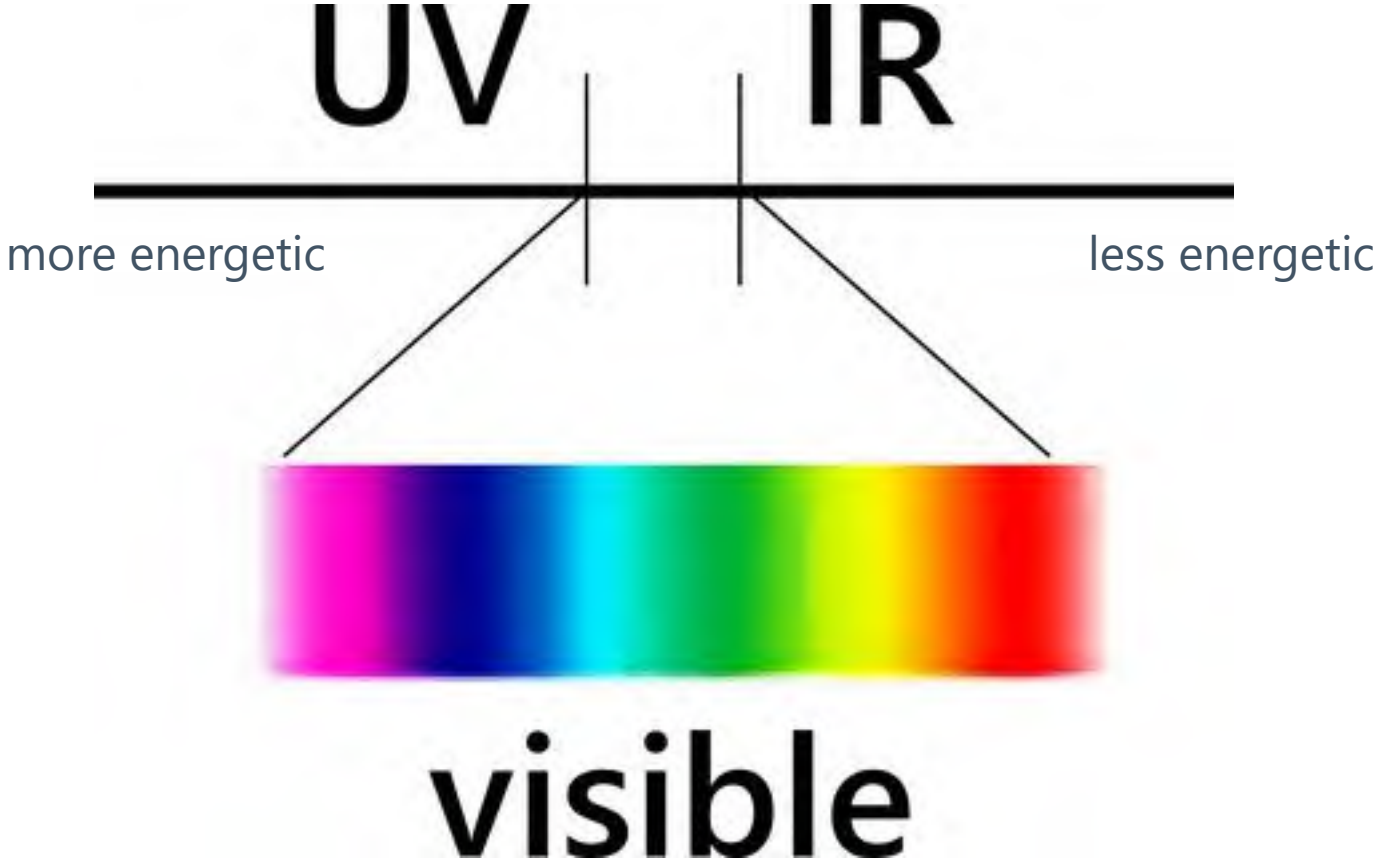
Microplastics are everywhere and in the news every day, yet there is a lot of misinformation

How to construct equipment to look for microplastics

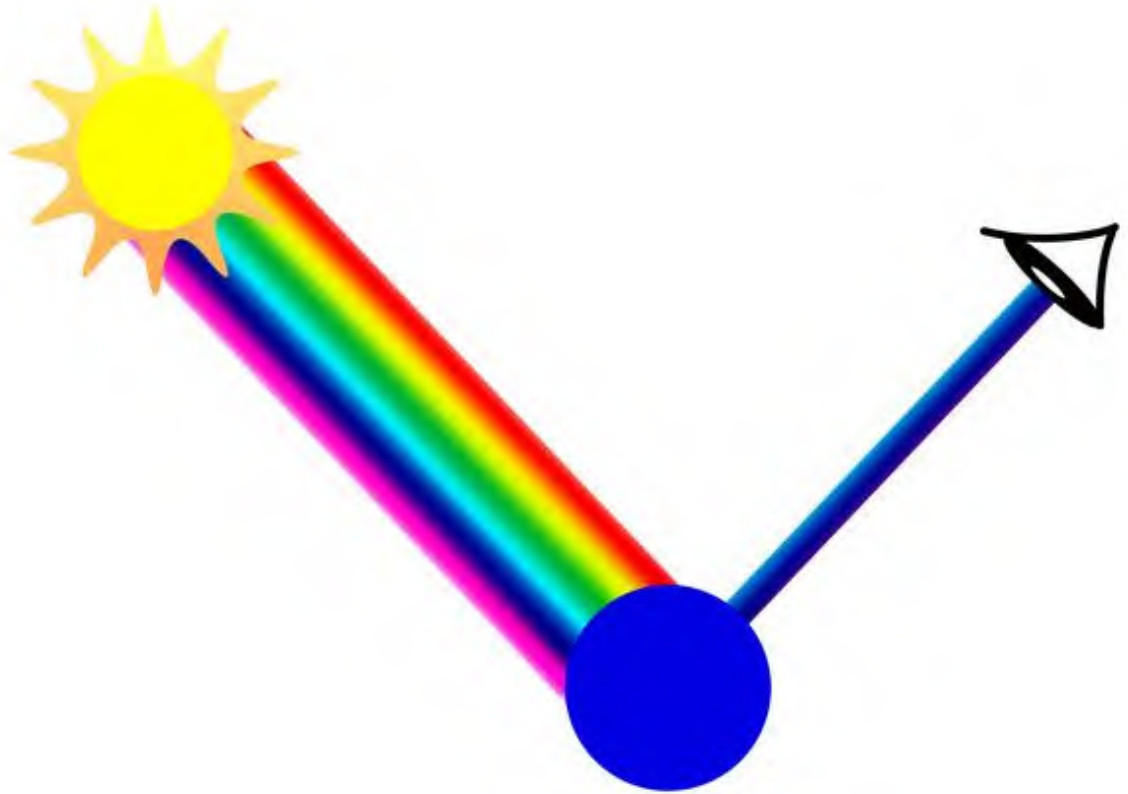

These are syenite, likely from near Marathon, ON.
They contain sodalite with some sulfide content.
Transported by glaciers, I find them in Michigan,
at night.
visible light


UV light
(365 nm filtered)


Lake Superior Watershed
Ogoki Diversion
Long Lac Diversion
Armstrong
Lake Nipigon
Jellicoe
Beardmore
Macdiarmid
Caramat
Hillsport
Ontario
Manitouwadge
Nipigon
Red Rock
Schreiber
Hurkett
Rossport
Terrace Bay
Marathon
Heron Bay
White River
Dubreuilville
Missanabie
Hawk Junction
Wawa
Kashabowie
Shebandowan
Lappe
Kaministiquia
Kakabeka Falls
Thunder Bay
Lake Superior
Minnesota
Grand Portage
Grand Marais
Babbitt
Aurora
Hoyt Lakes
Gilbert
Eveleth
Mountain Iron
Hibbing
Silver Bay
Tofte
Eagle Harbor
Hancock
Houghton
Ontonagon
Silver City
L'Anse
Marquette
Au Train
Munising
Newberry
Grand Marais
Paradise
Brimley
Sault Ste. Marie
Montreal River Harbour
Batchawana Bay
Searchmont
Goulais Bay
Two Harbors
Fredenberg
Duluth
Superior
Cloquet
Carlton
Red Cliff
Bayfield
Washburn
Ashland
Odanah
Ironwood
Hurley
Michigan
Wisconsin
Legend
Cities/Towns
State Borders
Rivers
International Border
Lake Superior Watershed
Diversions
N
W
E
S
0 25 50 100 Miles
100 50 0 100 Kilometres
Environment Canada
Environnement Canada
Canada


UV
IR
more energetic
less energetic
visible

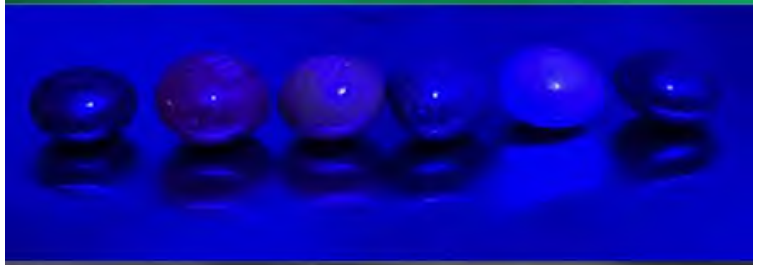
Normal Vision and Colors



red light

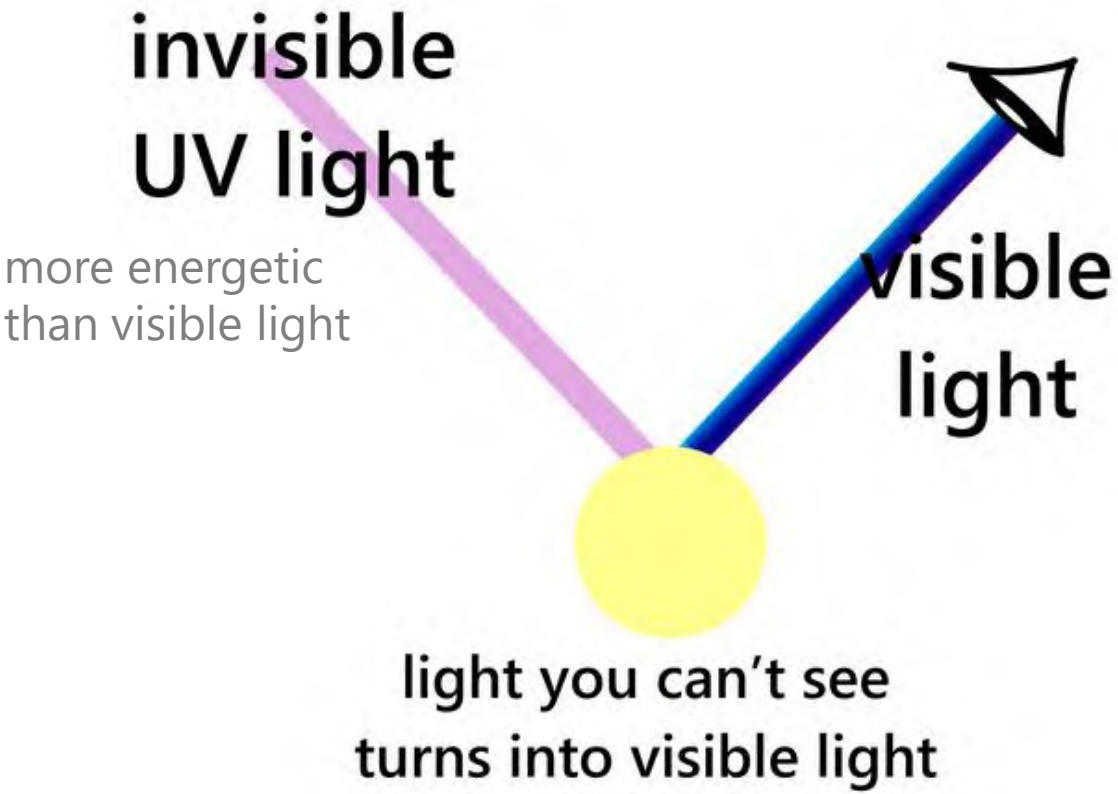
green light

blue light



white light

FLUORESCENCE

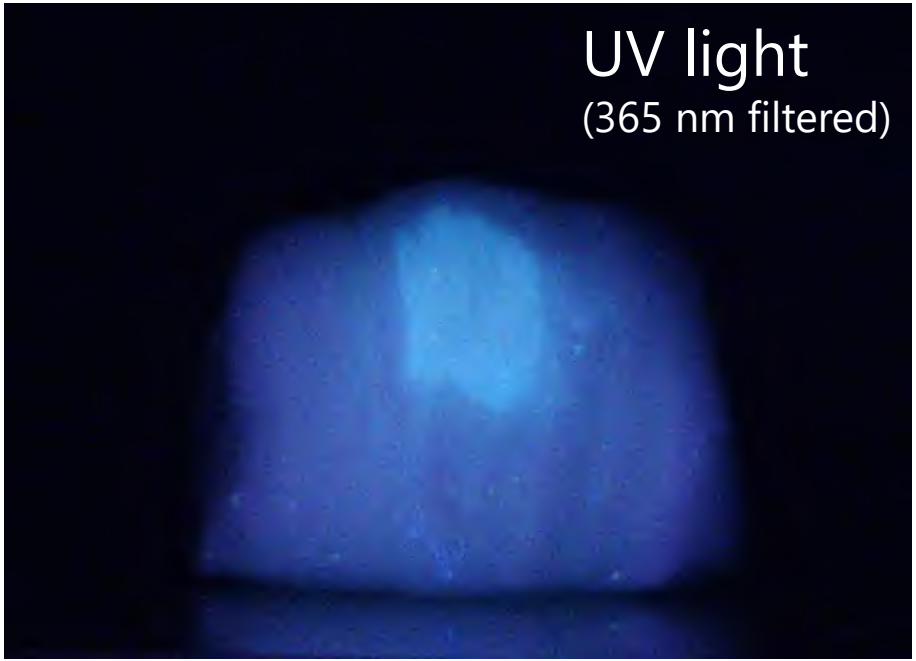


UV

white light

The filter is important. It gets rid of stray visible light making fluorescence much easier to see.

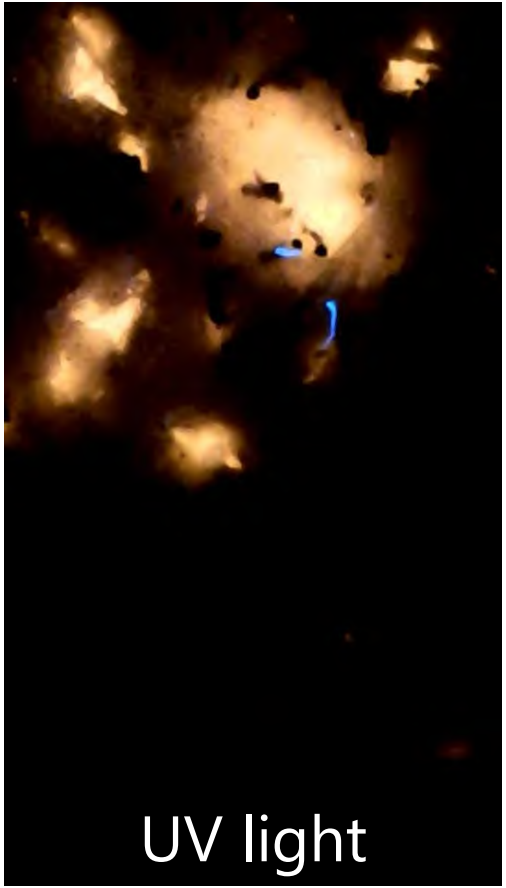

UV light
(365 nm filtered)

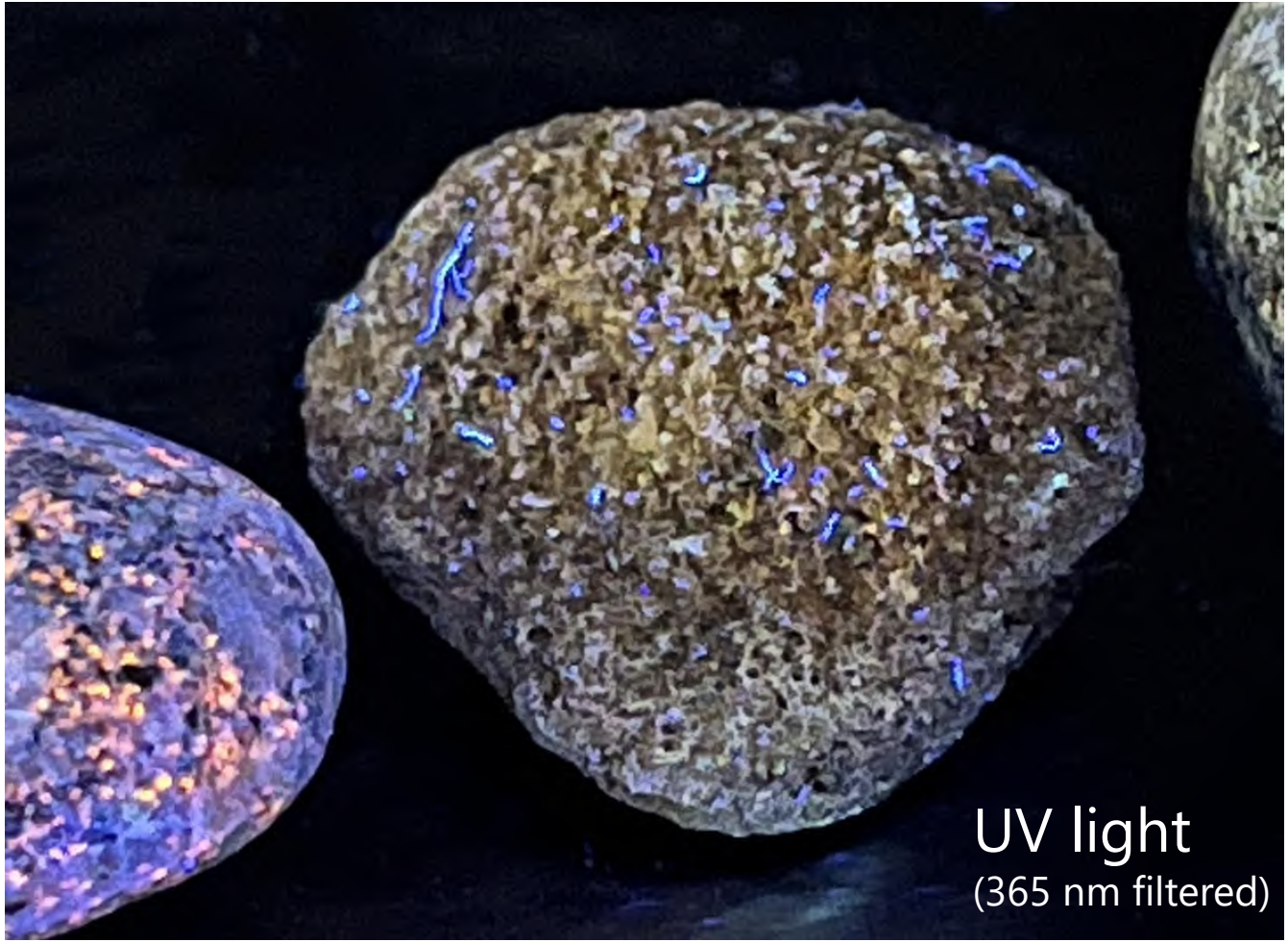

UV light
(365 nm filtered)


visible light


manipulated image


visible light


UV light

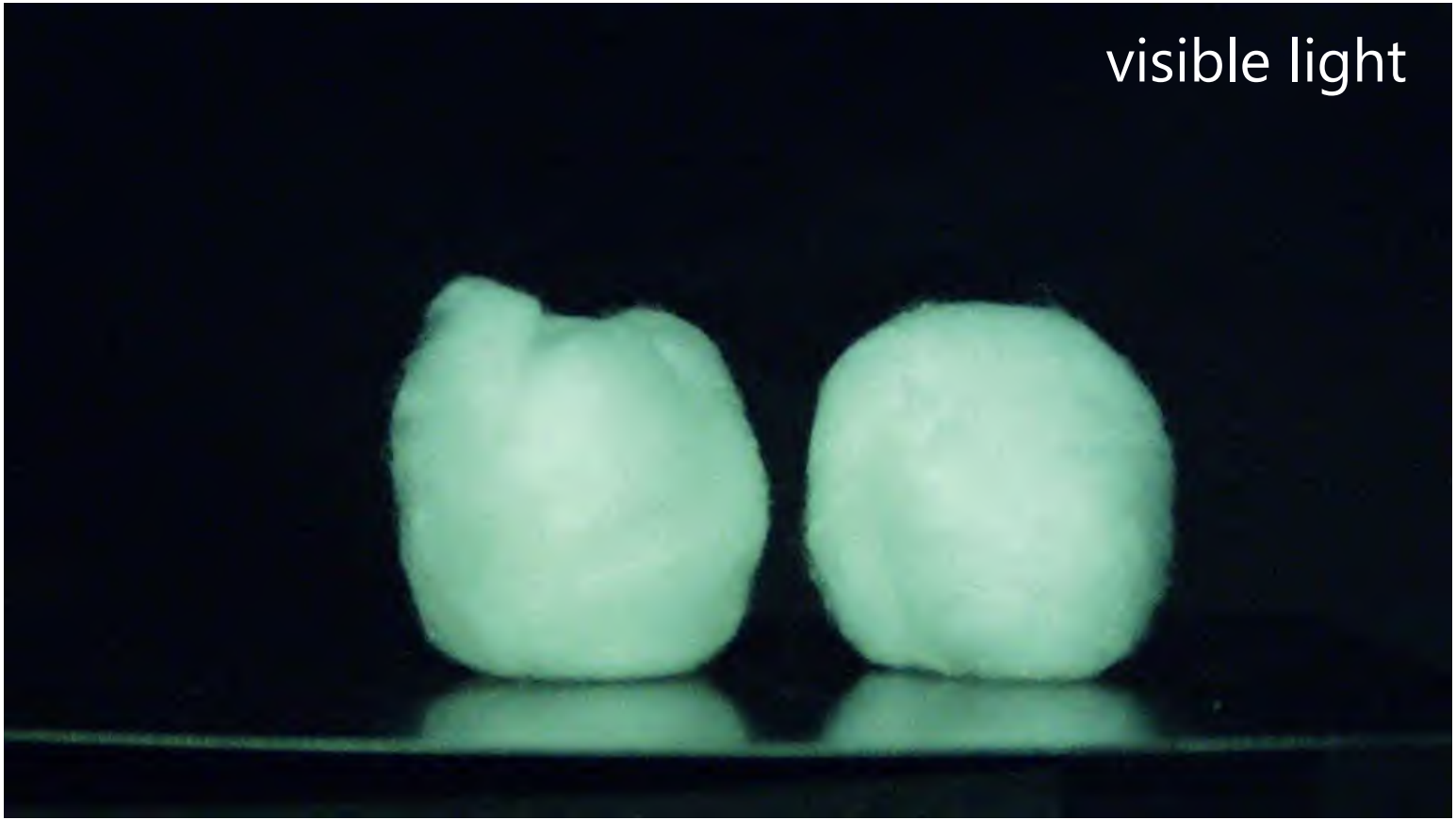

UV light
(365 nm filtered)

OBX Beach Sand

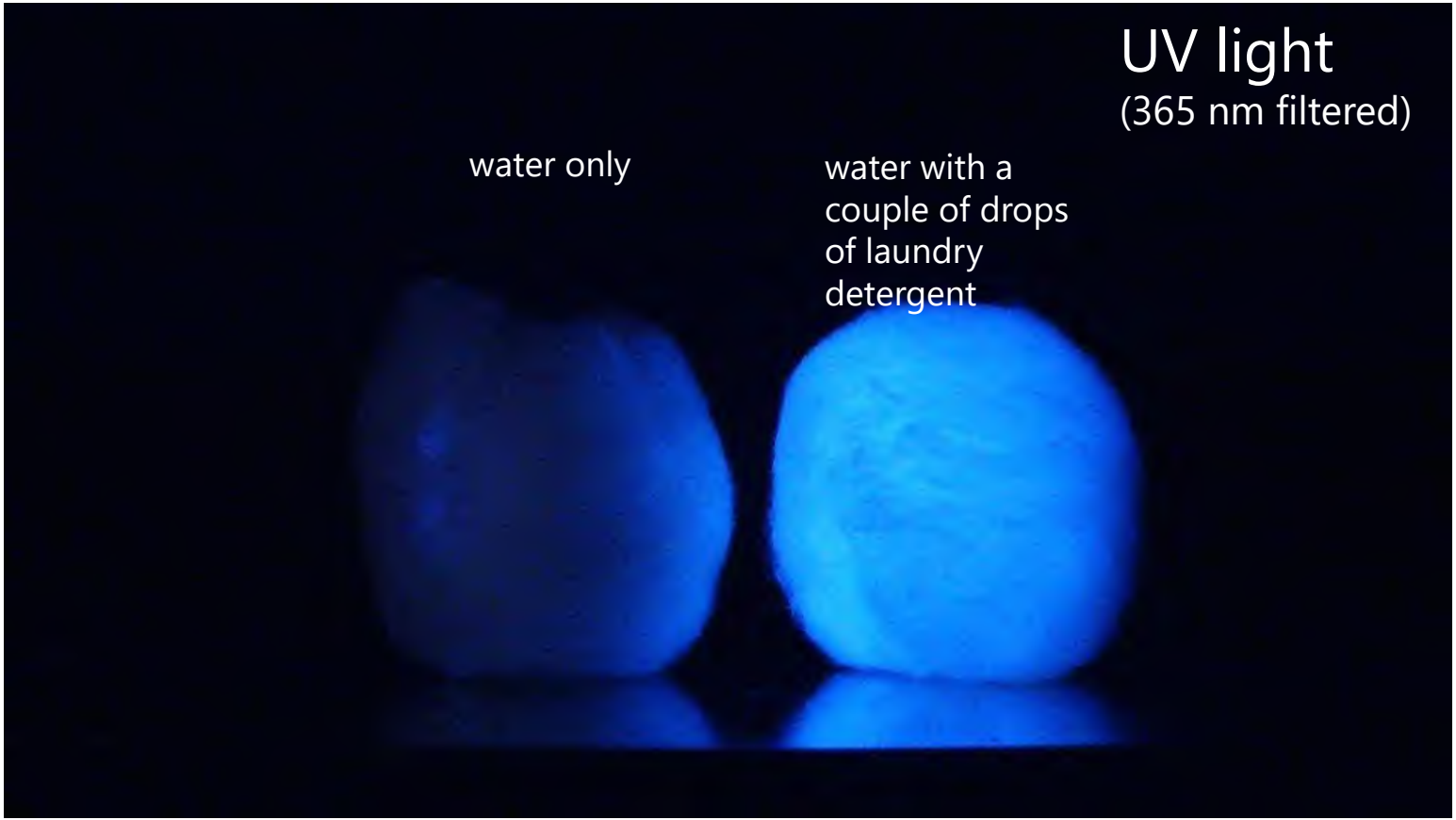
OBX Beach Sand

OBX Beach Sand

Cotton Balls

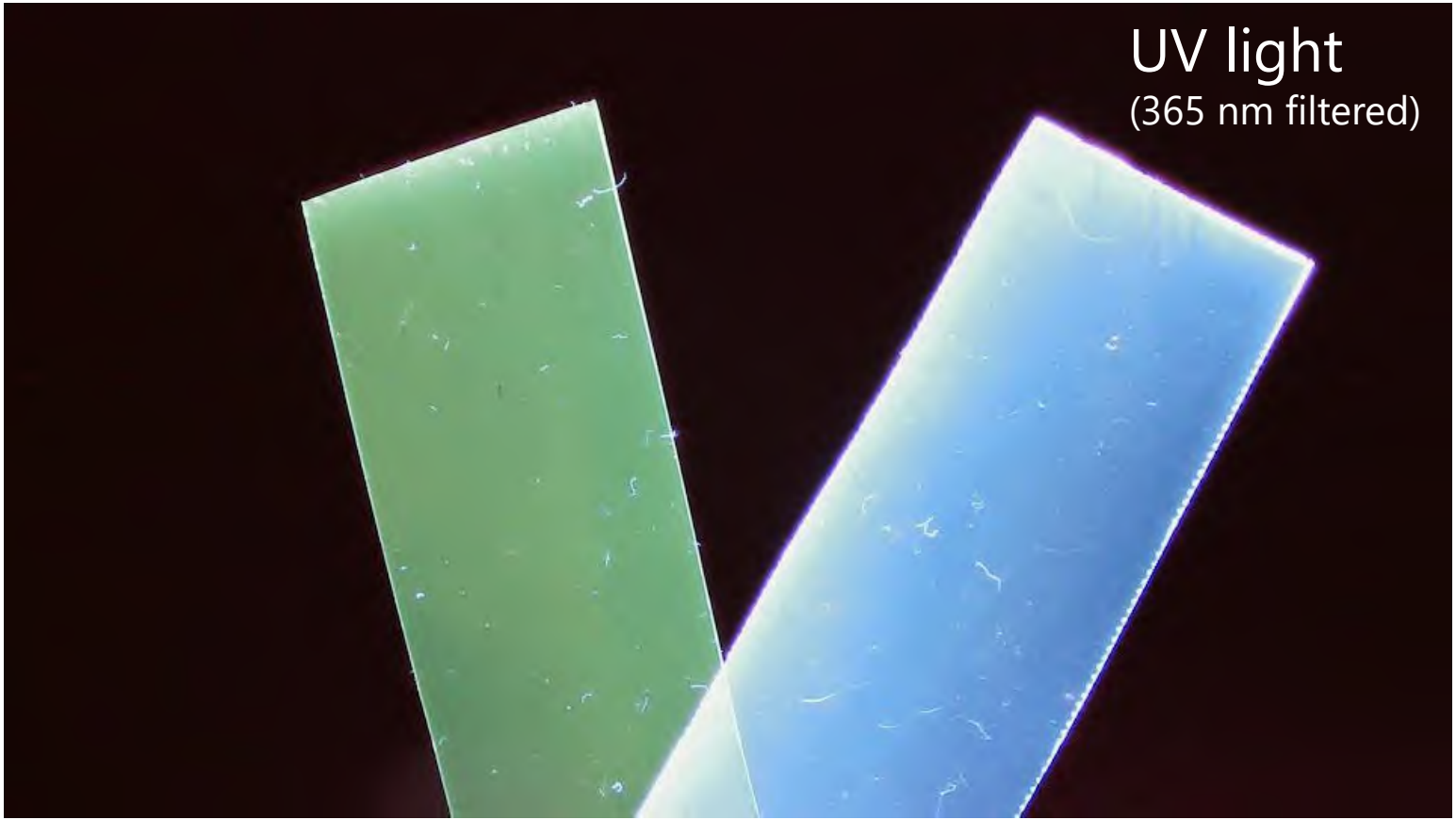


Cotton Balls – Optical Brighteners

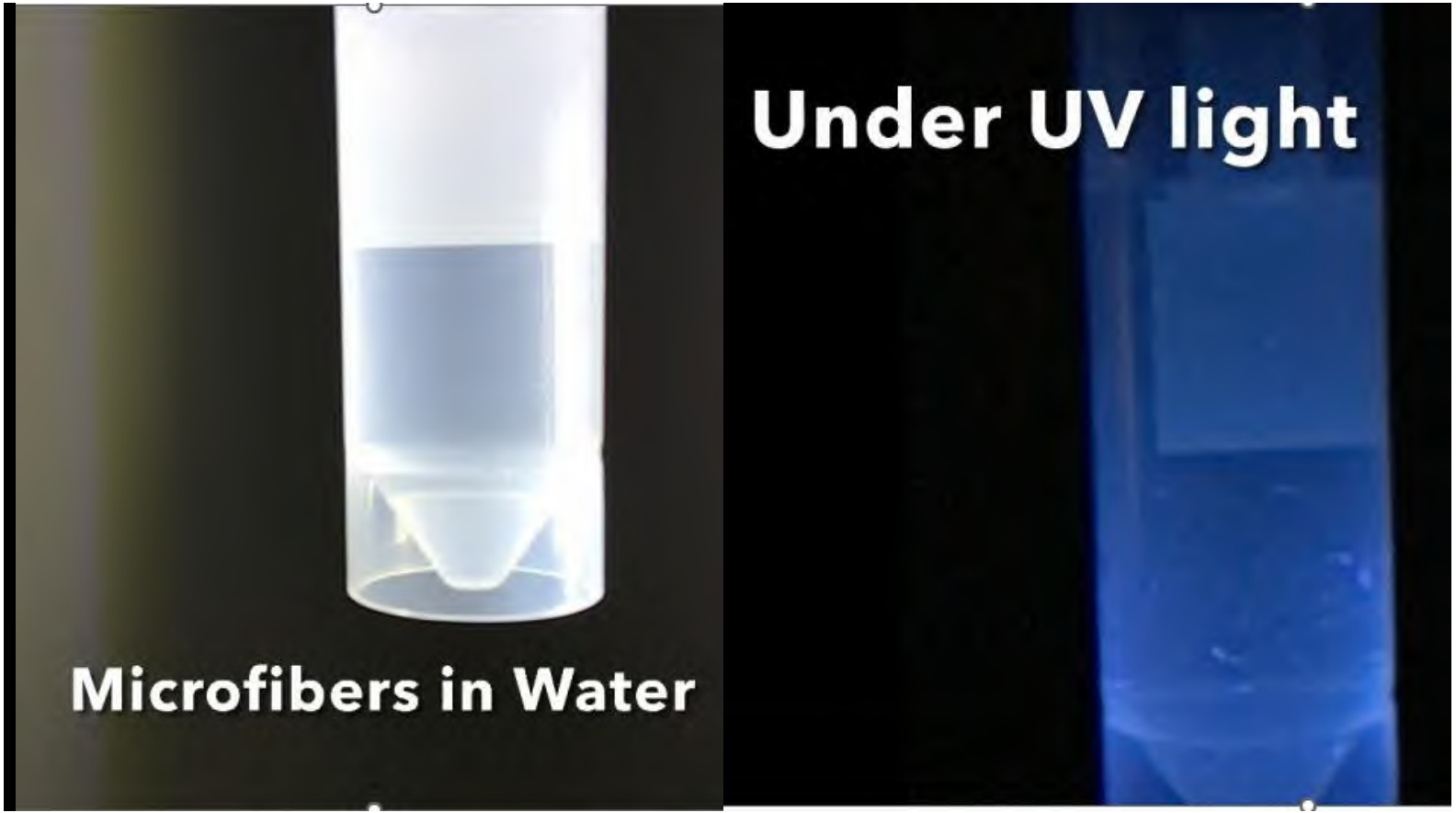


PET

PET – Optical Brighteners



MICROFIBERS




UV light
filter

Midland Local Section

CENTRAL MICHIGAN UNIVERSITY

Water Chemistry in the Great Lakes Region

https://www.cmich.edu/academics/colleges/college-science-engineering/centers/cmu-biological-station/h2o-q-in-the-classroom

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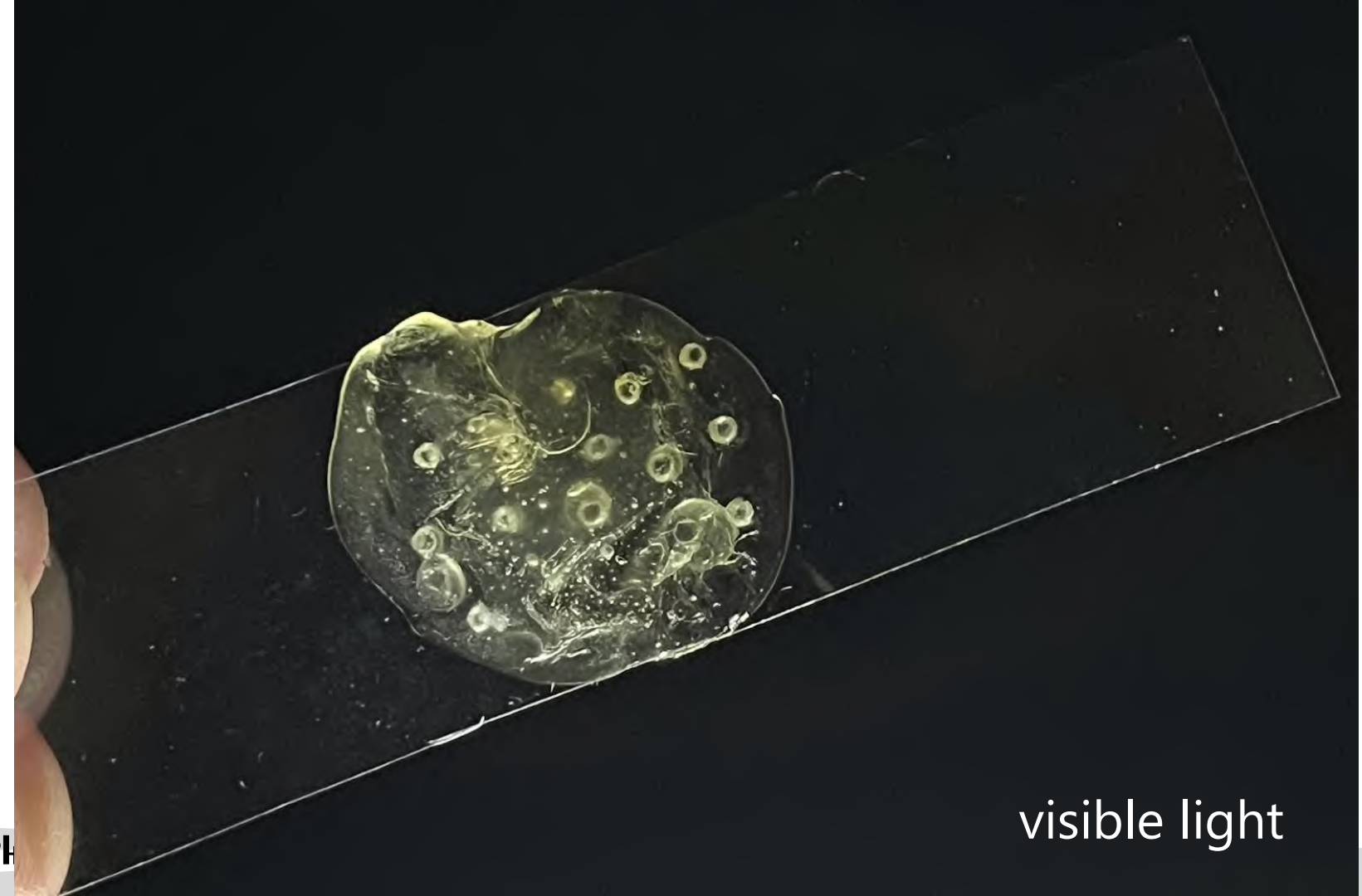
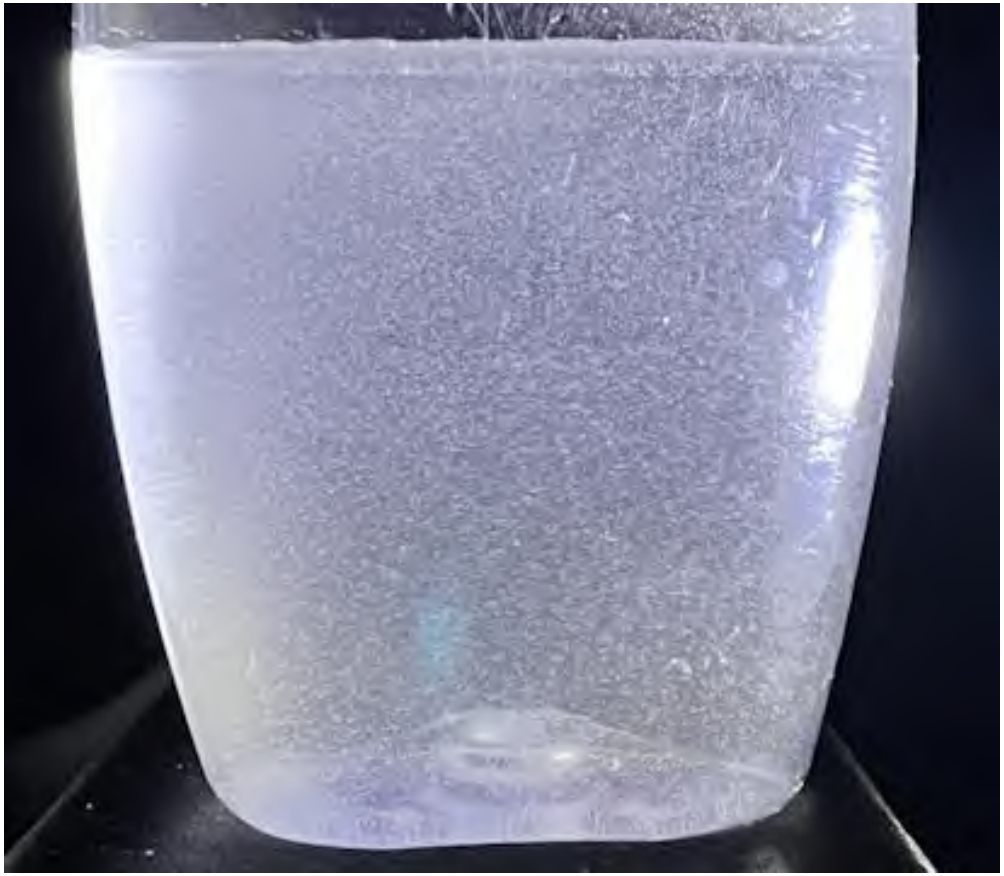
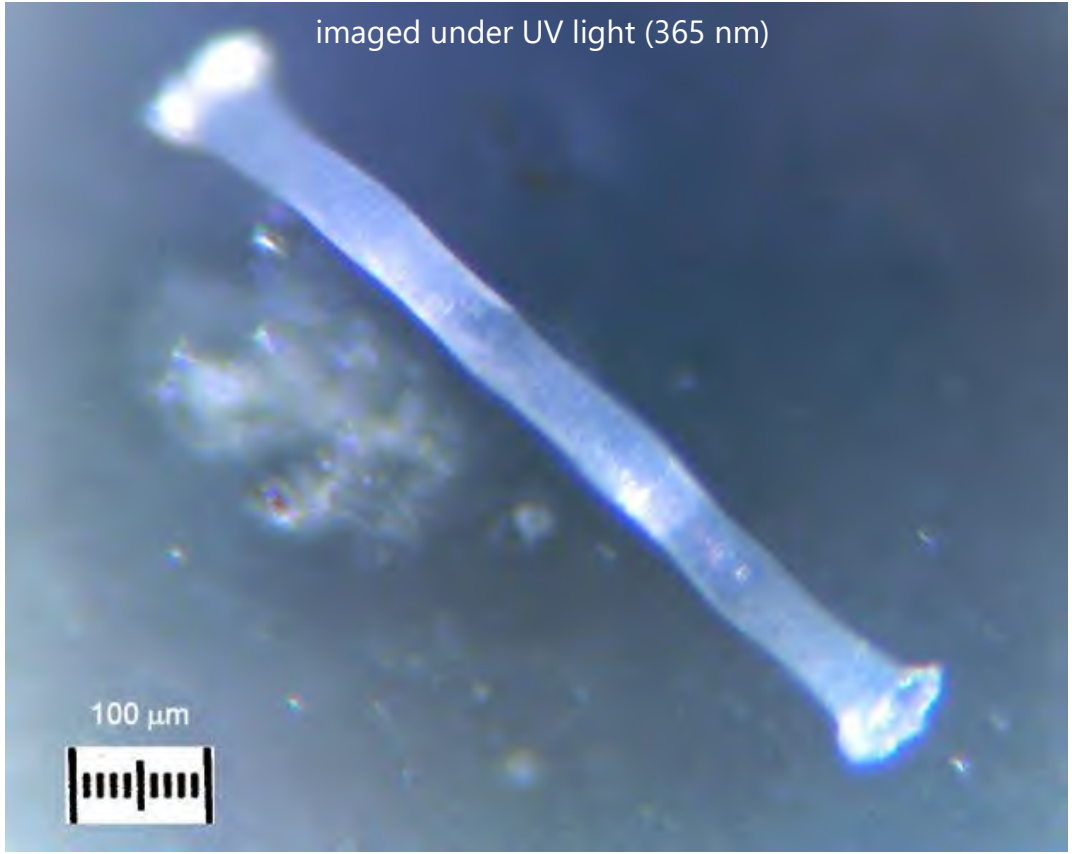

visible light




iPhone Video
of
Unopened Water Bottles

From Commercial Bottled Water

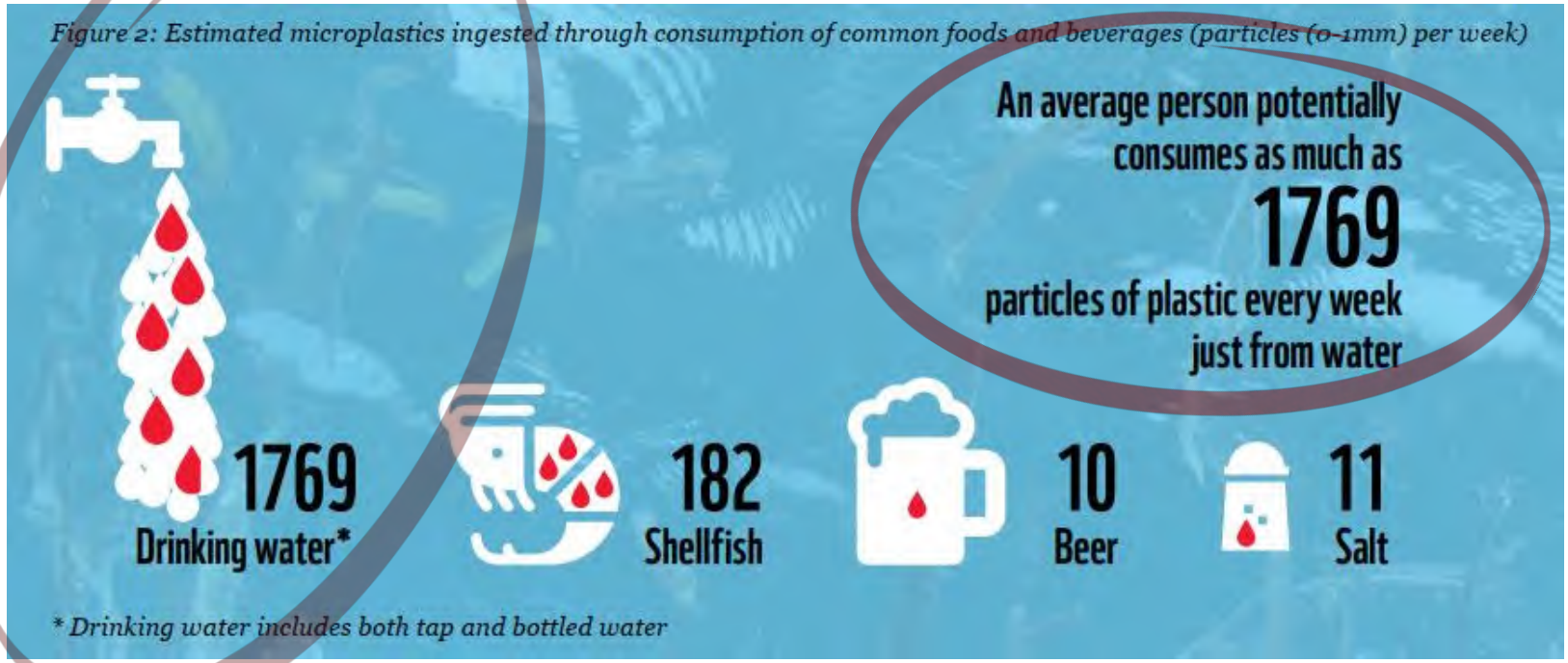


"A new study by the University of Newcastle, Australia suggests that an average person could be ingesting approximately 5 grams of plastic every week. The equivalent of a credit card's worth of microplastics. This summary report highlights the key ways plastic gets into our body, and what we can do about it."

wwfint.awsassets.panda.org/downloads/plastic_ingestion_web_spreads.pdf

wwf.panda.org/wwf_news/?348337/Revealed-plastic-ingestion-by-people-could-be-equating-to-a-credit-card-a-week

2.5 mg average particle to reach 5 grams.



Average 2.5 mg particles.

Plastic microparticles, 0.65 grams consisting of 523 particles, in a liter of water equaling the concentration in order to ingest 5 grams per week. Such a high concentration is easily seen both in water and upon drying. The particles are cut from 1.5 mm plastic monofilament.

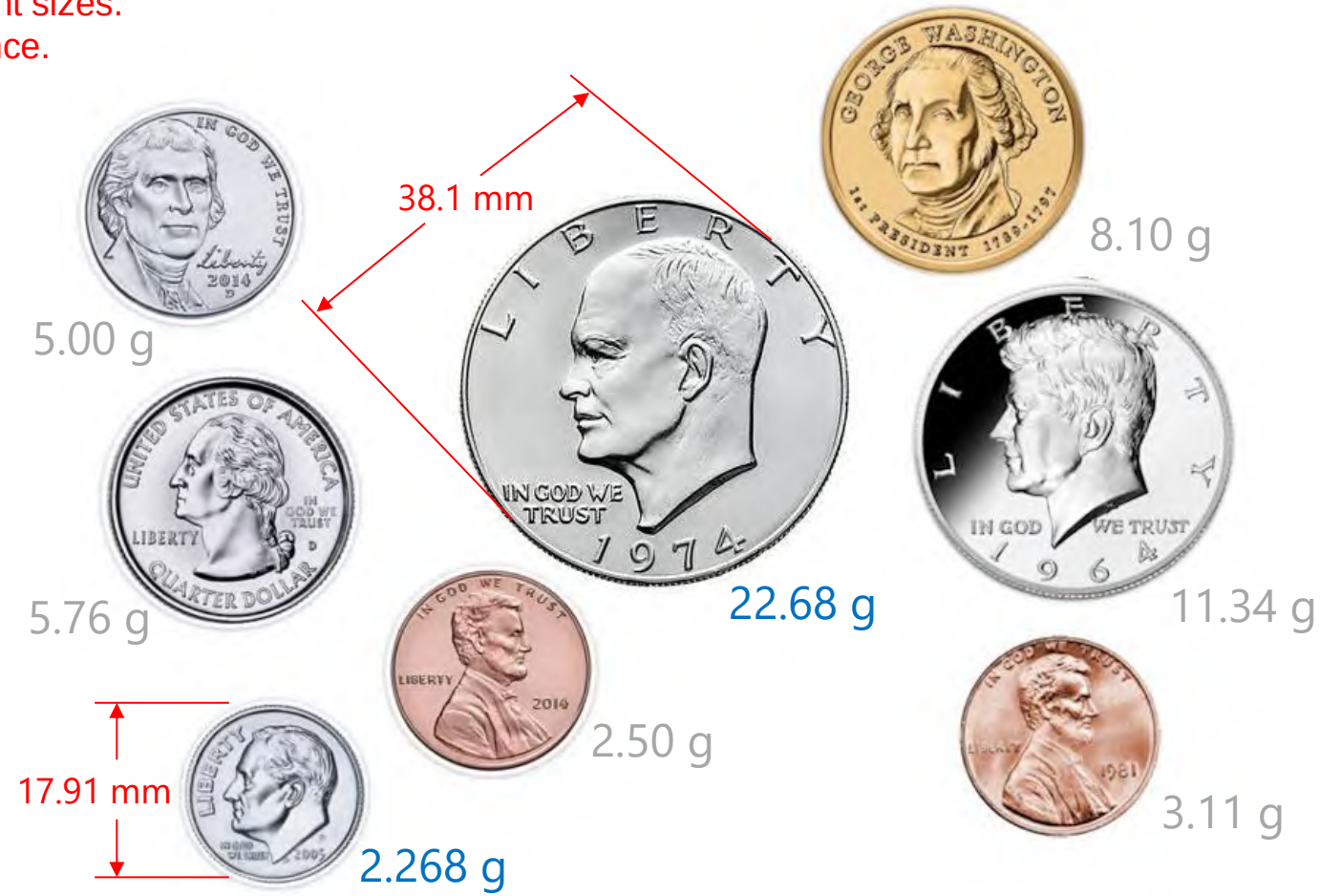
Dimes weigh 2.268 g

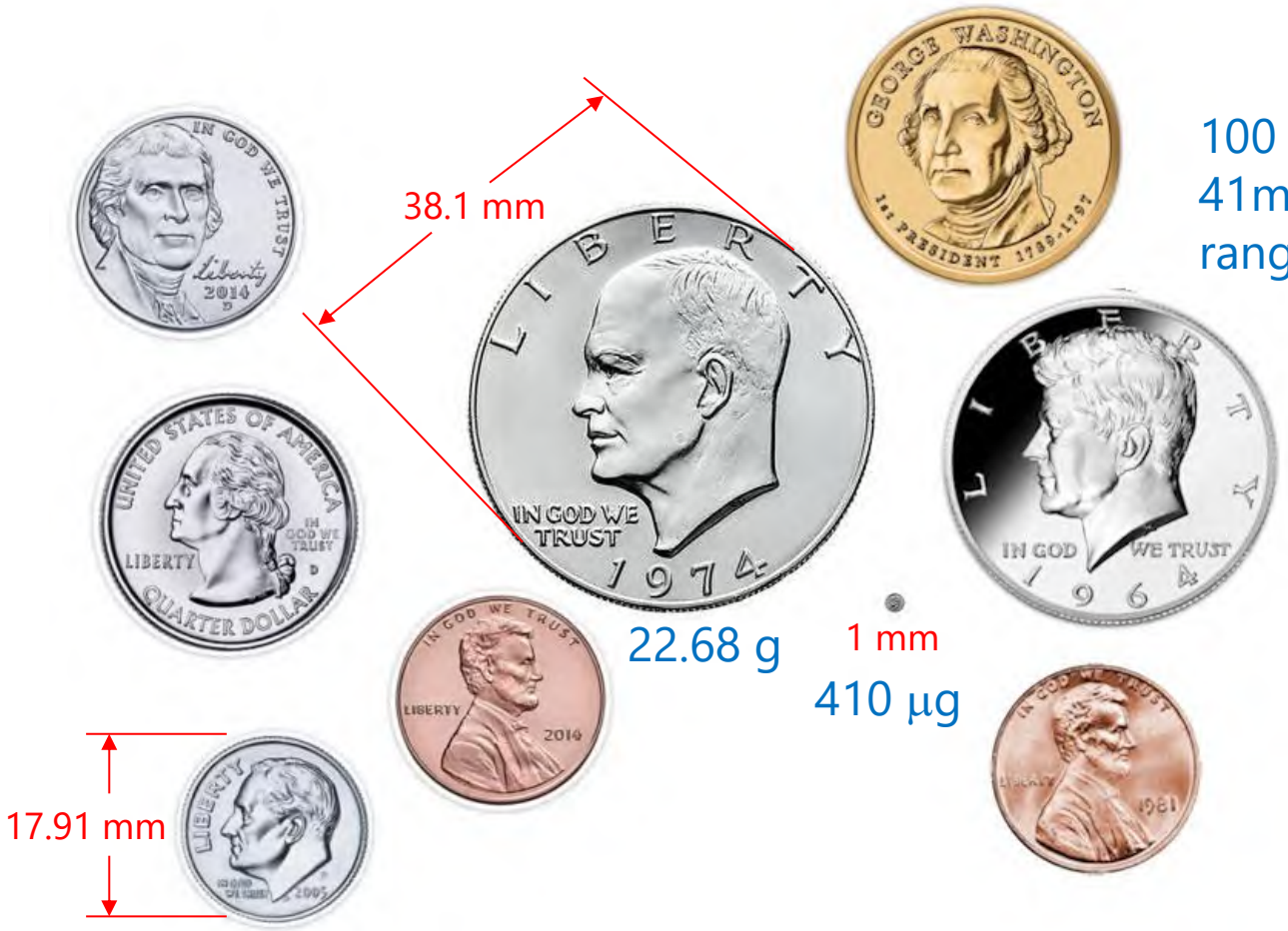
Diameter is 17.91 mm

dimes weigh 2.268 g

Coins of last 50 years
Pennies changed weight
in 1982.

Only 8 different sizes.
2.13X difference.




38.1 mm
17.91 mm
22.68 g
1 mm
410 µg
100 coins:
41mg – 2.268 kg
range = ~55,000

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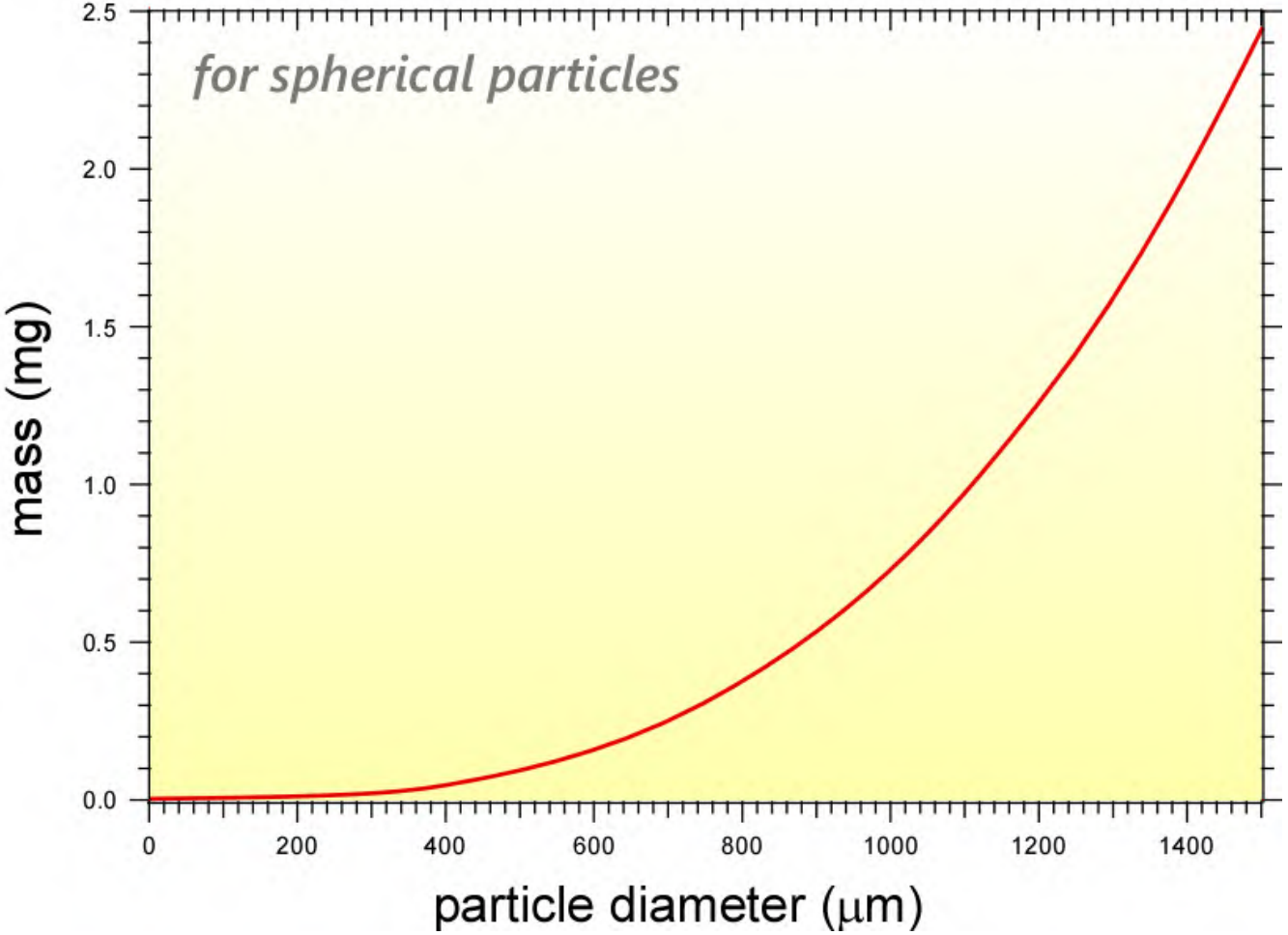
for spherical particles
mass (mg)
2.5
2.0
1.5
1.0
0.5
0.0
0
200
400
600
800
1000
1200
1400
particle diameter (μm)

Bert Koelmans makes point that a week's ingestion is like a grain of salt between chopsticks – mere micrograms.

Get a sample of water.

Filter out the small particles.

Count the particles.

current iteration designed to sample near but not at the surface

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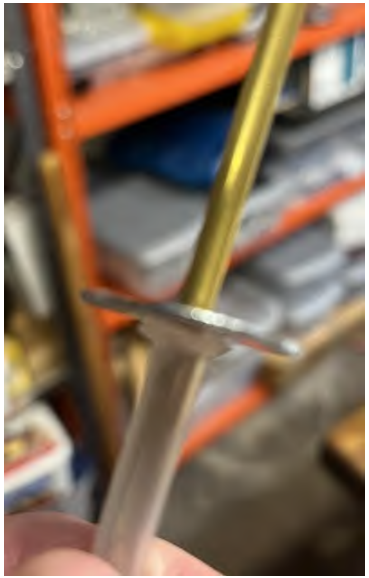
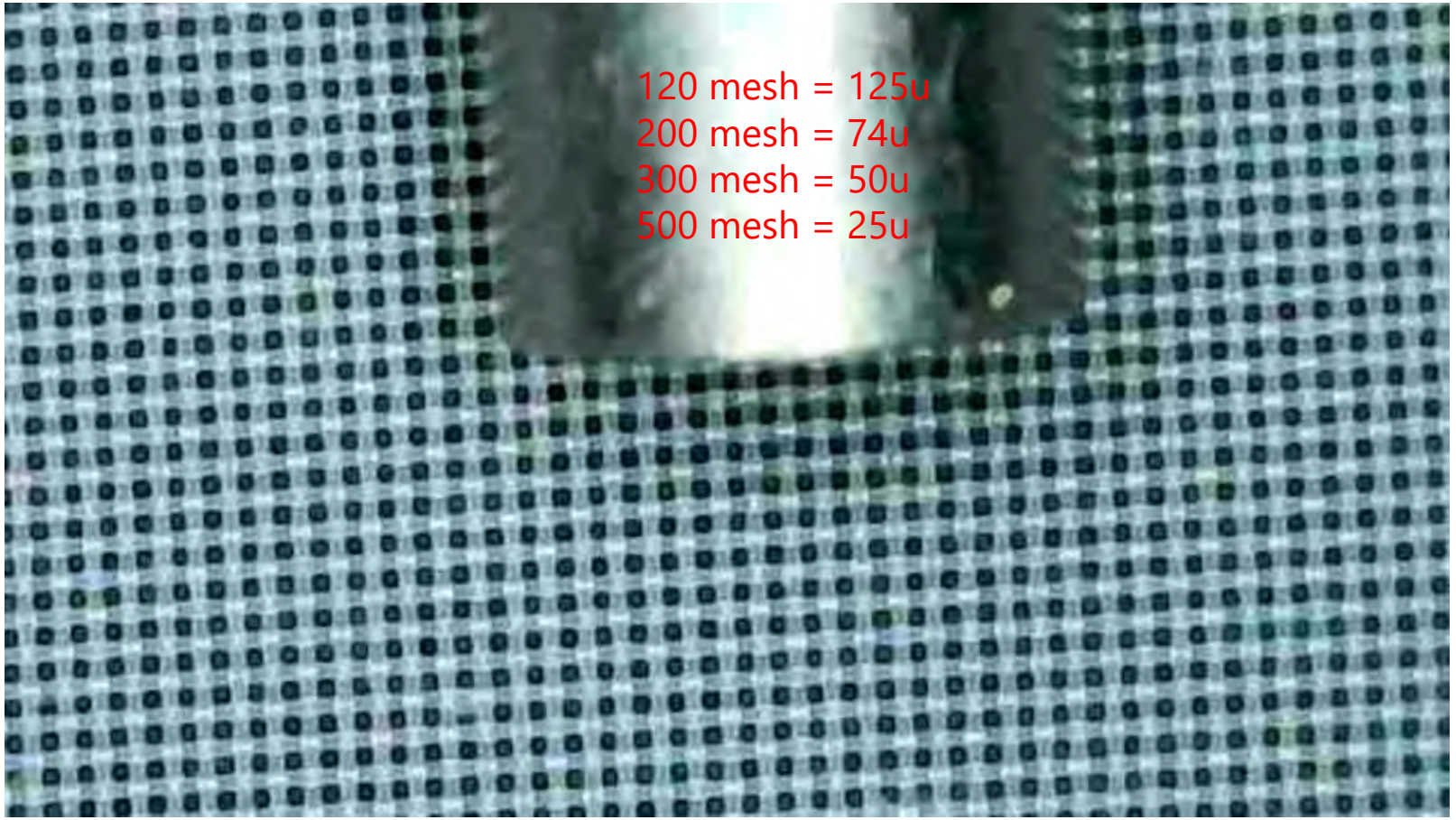
various options for filters explored

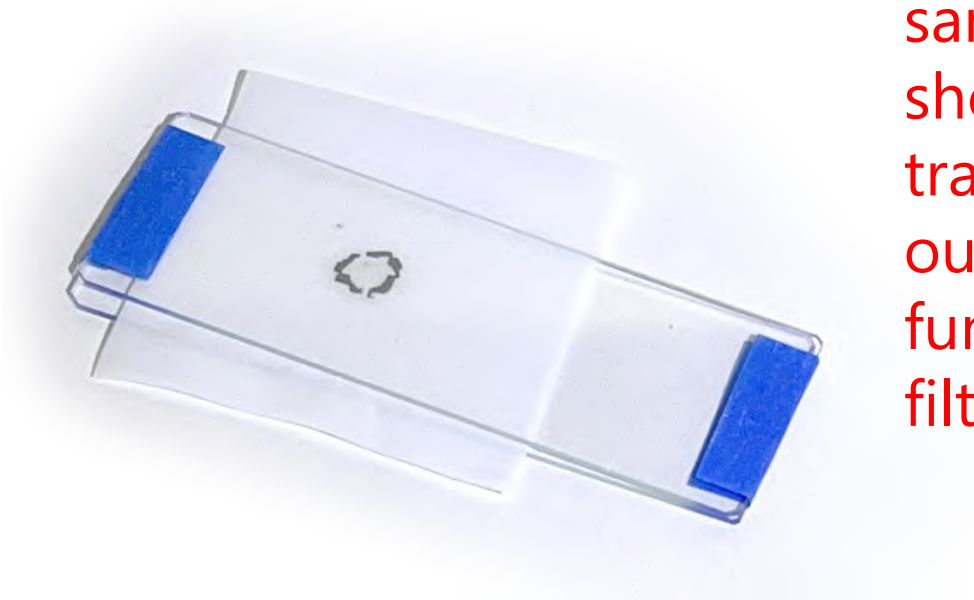
current iteration designed to filter at microscope resolution






Silk Screen Fabric as Filters





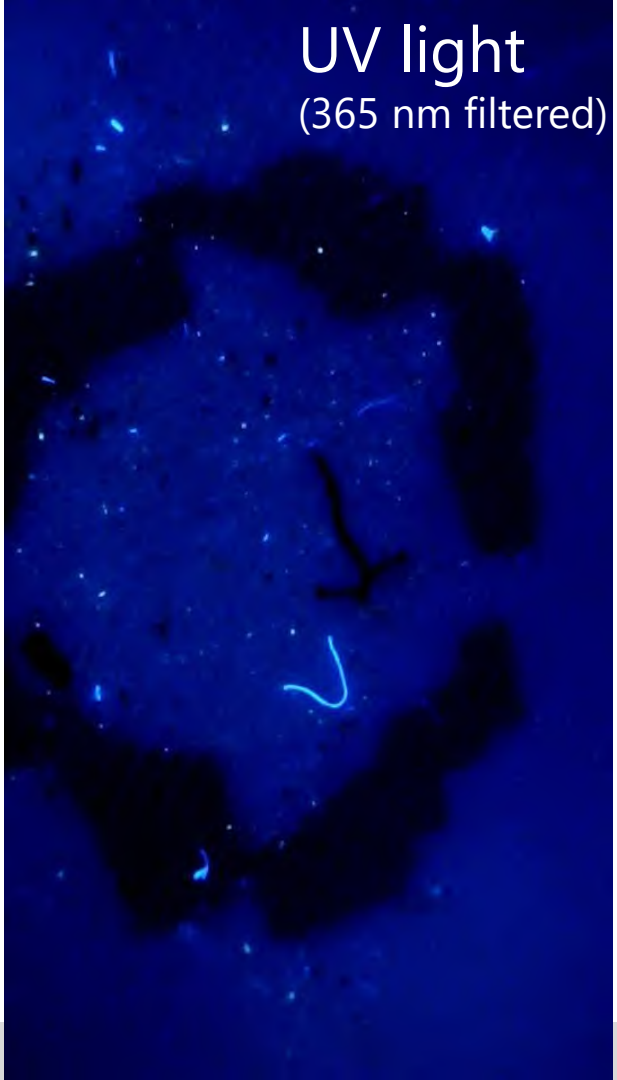
slide sandwich showing traced outline of funnel on filter media


UV light
filter

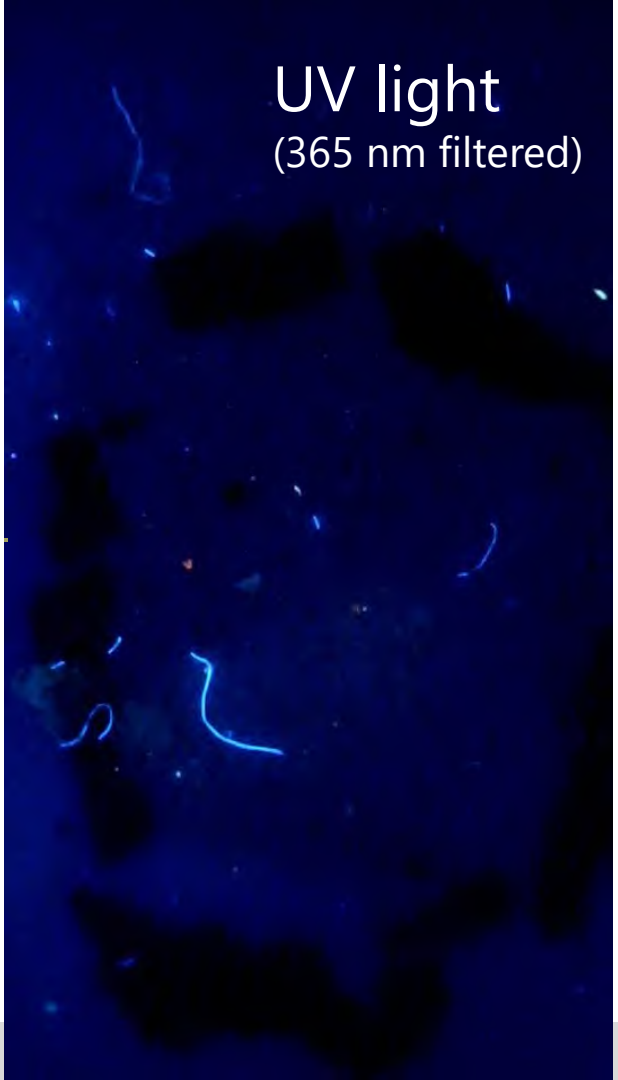
Sampling Steps

- Use masking tape to make microscope slide sandwich leaving one side open
- Open slide sandwich
- Rinse funnel with sample
- Dry tip
- Pull filter mesh around tip
- Outline funnel tip on filter fabric with marker
- Push retainer over fabric snuggly ensuring outline doesn’t move
- Pass 500 mL of water through funnel
- If filtering slows or doesn’t flow, use syringe to pressurize
- Carefully remove retainer
- Place on filter paper to dry
- Put in on slide and close the sandwich


visible light


UV light
(365 nm filtered)


visible light


UV light
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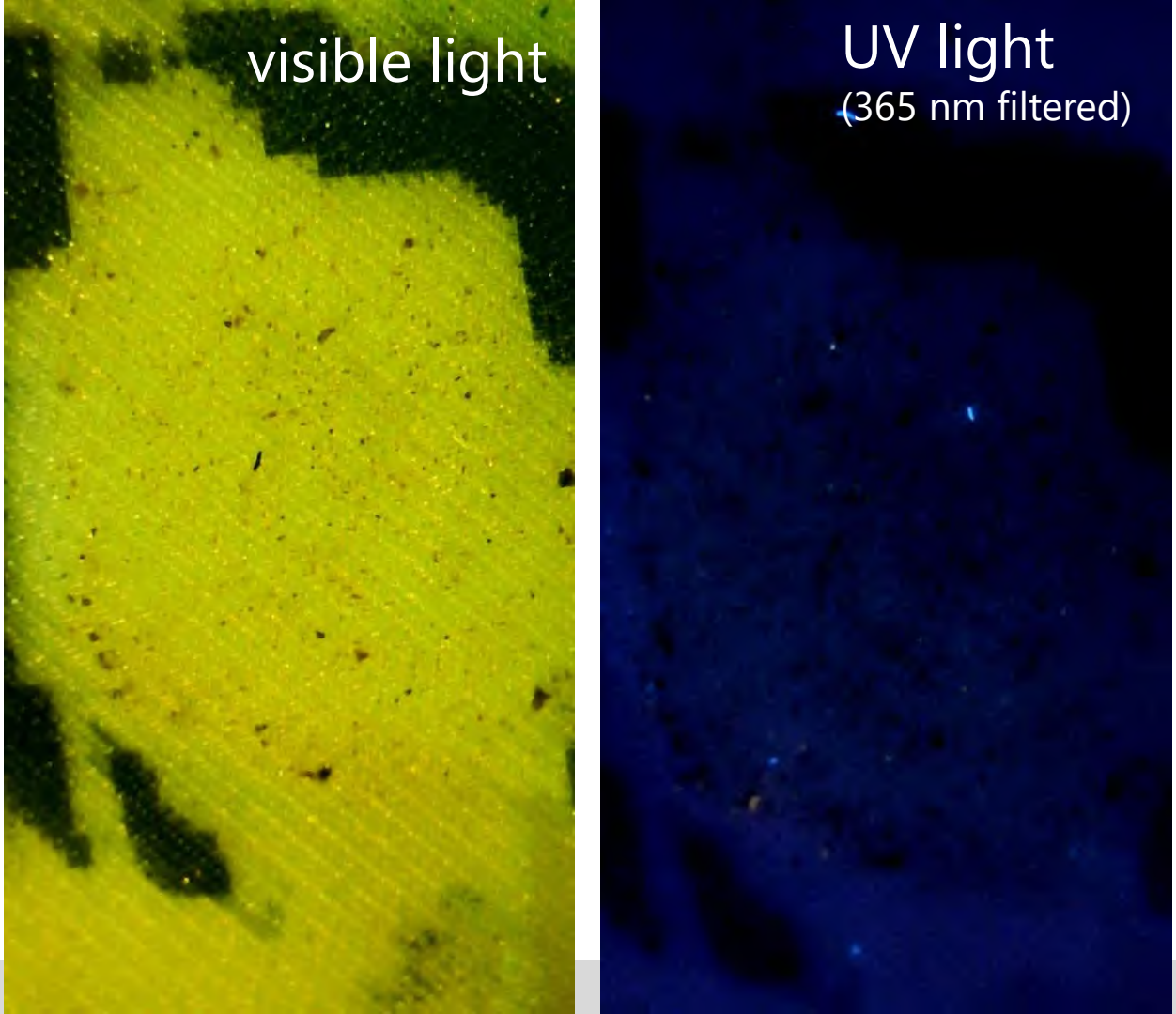
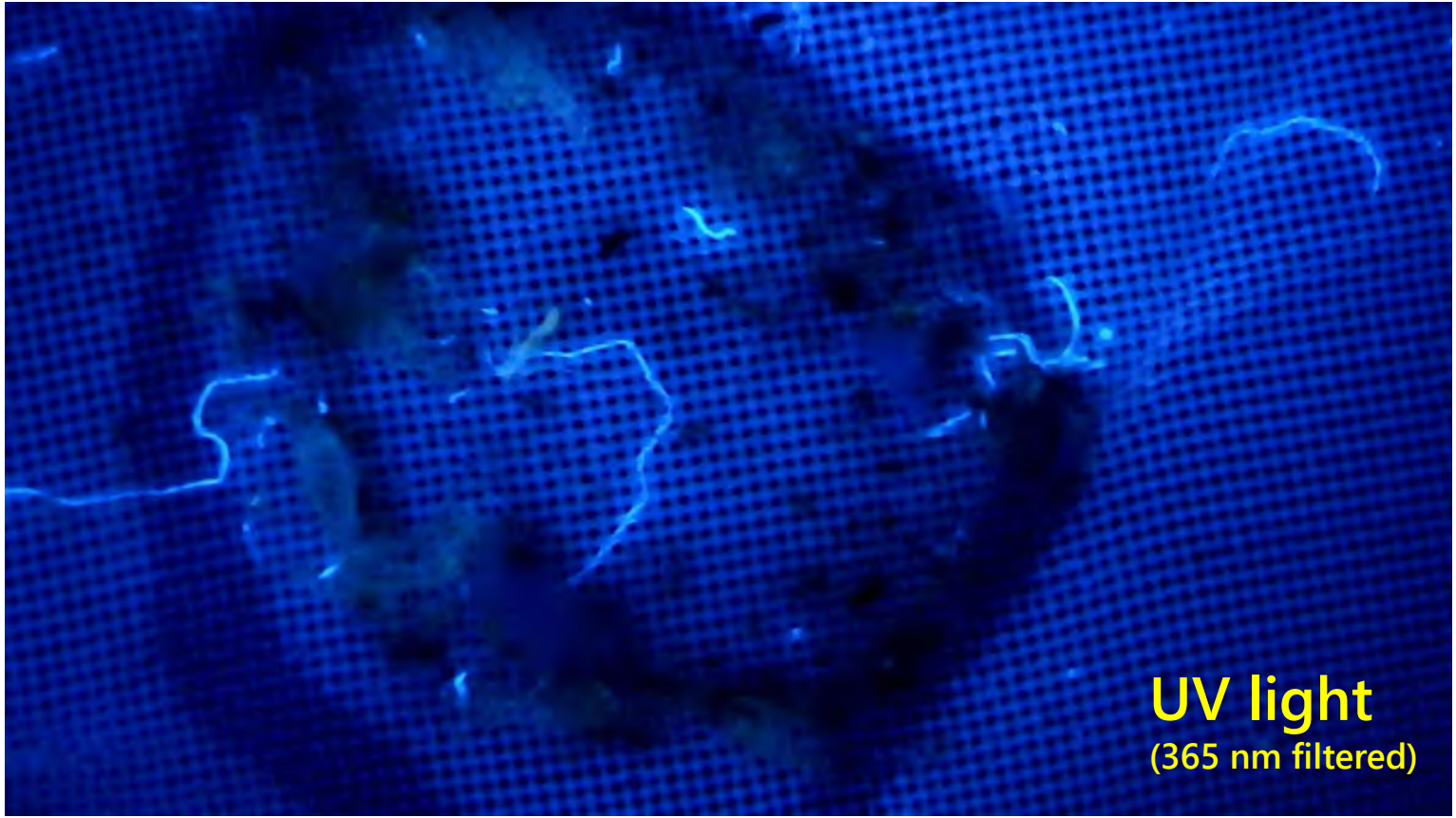

visible light
UV light
(365 nm filtered)

OBX Ocean Water

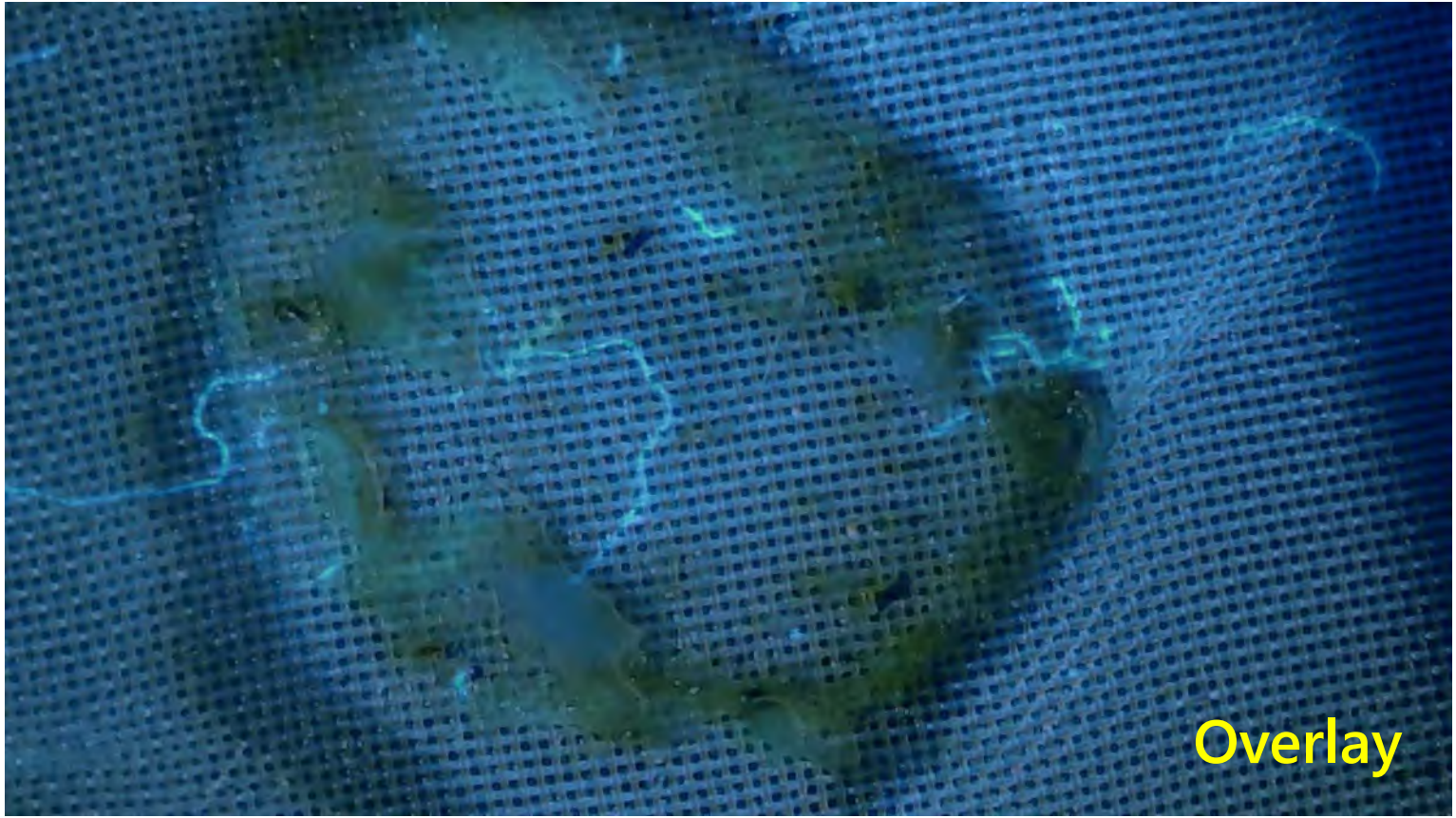
OBX Ocean Water



ible

OBX Ocean Water

ght
filtered)



Water Research 155 (2019) 410–422

Contents lists available at ScienceDirect

Water Research

journal homepage: www.elsevier.com/locate/watres

Review

Microplastics in freshwaters and drinking water: Critical review and assessment of data quality

Albert A. Koelmans [a, *], Nur Hazimah Mohamed Nor [a], Enya Hermsen [a], Merel Kooi [a], Svenja M. Mintenig [b, c], Jennifer De France [d, **]

[a] Aquatic Ecology and Water Quality Management Group, Wageningen University, the Netherlands
[b] KWR Watercycle Research Institute, the Netherlands
[c] Wetsus, European Centre of Excellence for Sustainable Water Technology, the Netherlands
[d] World Health Organization, 20, Avenue Appia, 1211, Geneva, Switzerland

high quality data is difficult!

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Keywords:
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Waste water
Surface water
Human health

ABSTRACT

Microplastics have recently been detected in drinking water as well as in drinking water sources. This presence has triggered discussions on possible implications for human health. However, there have been questions regarding the quality of these occurrence studies since there are no standard sampling, extraction and identification methods for microplastics. Accordingly, we assessed the quality of fifty studies researching microplastics in drinking water and in its major freshwater sources. This includes an assessment of microplastic occurrence data from river and lake water, groundwater, tap water and bottled drinking water. Studies of occurrence in wastewater were also reviewed. We review and propose best practices to sample, extract and detect microplastics and provide a quantitative quality assessment of studies reporting microplastic concentrations. Further, we summarize the findings related to microplastic concentrations, polymer types and particle shapes. Microplastics are frequently present in freshwaters and drinking water, and number concentrations spanned ten orders of magnitude (1×10^{-2} to 10^{8} #/m^3) across individual samples and water types. However, only four out of 50 studies received

Midland American Chemical Society

SALTWATCH.ORG

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Awards List
Top
Scope
Eligibility
Package
Judging
Deadline
Submitting

Nominations
Past Recipients

Outstanding Middle School Level Science Teaching

Each year, the Midland Section of the American Chemical Society presents the Outstanding Middle School Science Teaching award.

Scope: To recognize an extraordinary middle school level educator within the ACS Midland Section. One candidate will be selected from the submitted nominations based on their teaching contributions/achievements in this category.

Eligibility: Candidates for the teaching awards must be educators at schools in the five-county geographical area of the Midland Section: Bay, Gratiot, Isabella, Midland, and Saginaw Counties. Candidates are not required to be ACS members.

Nomination Package: Nomination packets must, at a minimum, consist of a current resume or equivalent, a nominating letter, and at least one supporting letter. All letters should state why the nominee is deserving of the award with specific examples of professional involvement/growth, contributions to the profession, and outside affiliations. Additional letters of support from students, parents, community members, and/or administrators may be included.

Nominations not meeting the minimum requirements will be rejected.

Judging: Selected by the Awards Committee.

Deadline: The deadline for nominations is Sunday, March 23, 2025. Submissions received after the March 23 deadline will not be considered. The Midland ACS Local Section reserves the right to extend the nomination window. A notice of extension will be published on the Midland ACS website, midlandacs.org.

Submitting: Complete nomination packages should be submitted to Wendy Flory or Tami Sivy, Co-chairs, Midland Section ACS Awards Committee, E-mail: wcflory@dow.com or tsivy@svsu.edu or awards@midlandacs.org.

All submissions must be accompanied by the name, position, address, and phone number of the nominator.

Electronic (e-mail) submissions are preferred. Mail or fax submissions are acceptable.

Yooperlites and that using different light to view the world can illuminate new things

Microplastics are everywhere and in the news every day, yet there is a lot of misinformation

How to construct equipment to look for microplastics

MJPHD.net