



Supplement of




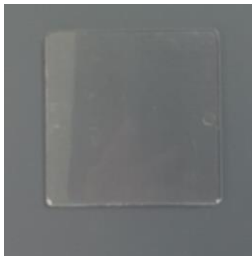

Hyperspectral reflectance dataset of pristine, weathered, and biofouled plastics

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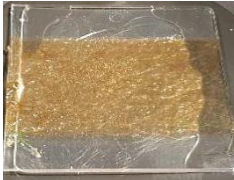
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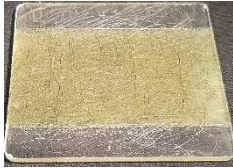





Table S1. Overview of the plastic specimens analyzed in the current work. Polymer type refers to the available information from the supplier or product, unless stated otherwise. Selected polymer types were confirmed by uFTIR. Pictures in this table are taken by Giulia Leone and Mattias Bossaer.

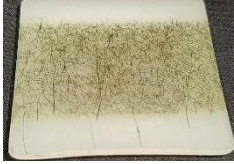



Type	Plastic specimen	Condition of the assessment	Picture	Polymer type	Available measurements (d: dry, w: wet, s: submerged)	Dimensions (cm)
Commercial plastics	Sheet	Dry		PE (confirmed by μ FTIR)	d, w, s	6 x 6
	Sheet	Dry		PP (confirmed by μ FTIR)	d, w, s	6 x 6
	Sheet	Dry		PET amorphous (confirmed by μ FTIR)	d, w, s	6 x 6
	Sheet	Dry		PET crystalline (confirmed by μ FTIR)	d, w, s	6 x 6
	Sheet	Dry		PS (confirmed by μ FTIR)	d, w, s	6 x 6





Weathered plastics from shops	Sheet	Dry		PVC (Thermoplastic elastomer under μ FTIR)	d	2 x 4
	Sheet	Dry		PP (confirmed by μ FTIR)	d	2 x 4
	Sheet	Dry		PS (confirmed by μ FTIR)	d	2 x 4
Biofilm plastics from shops	Sheet	Dry		PVC (Thermoplastic elastomer under μ FTIR)	d	2 x 10
	Sheet	Dry		PP (confirmed by μ FTIR)	d	2 x 10
	Sheet	Dry		PS (confirmed by μ FTIR)	d	2 x 10


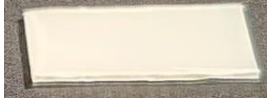




Plastic from shops	Sheet	Dry	ND	PVC (Thermoplastic elastomer under μ FTIR)	d	2 x 10
	Sheet	Dry	ND	PP (confirmed by μ FTIR)	d	2 x 10
	Sheet	Dry	ND	PS (confirmed by μ FTIR)	d	2 x 10
	Spar bag	Dry		LDPE (paraffin under μ FTIR)	d	ND
Jumbo bag	Dry		ND	d	ND	
Bottle	Dry		ND	d	ND	
Biofilm commercial plastics	Sheet	Wet rough		PP (confirmed by μ FTIR)	d, w, s	6 x 6

Sheet	Wet smooth		PP (confirmed by μ FTIR)	s	d, w,	6 x 6
Sheet	Wet rough		PE (confirmed by μ FTIR)		d, w, s	6 x 6
Sheet	Wet smooth		PE (confirmed by μ FTIR)		d, w, s	6 x 6
Sheet	Wet rough		PS (confirmed by μ FTIR)		d, w, s	6 x 6
Sheet	Wet smooth		PS (confirmed by μ FTIR)		d, w, s	6 x 6
Sheet	Wet rough		PET Amorphous (confirmed by μ FTIR)		d, w, s	6 x 6
Sheet	Wet smooth		PET amorphous (confirmed by μ FTIR)		d, w, s	6 x 6

Sheet	Wet rough		PET Crystalline (confirmed by μ FTIR)	d, w, s	6 x 6
Sheet	Wet smooth		PET crystalline (confirmed by μ FTIR)	d, w, s	6 x 6
Sheet	Dry rough		PS (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry smooth		PS (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry rough		PE (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry smooth		PE (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry rough		PET amorphous (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry smooth		PET amorphous (confirmed by μ FTIR)	d	6 x 6

Sheet	Dry rough		PP (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry smooth		PP (confirmed by μ FTIR)	d	6 x 6
Sheet	Dry rough		PET crystalline (confirmed by μ FTIR)	d	6x6
Sheet	Dry smooth		PET crystalline (confirmed by μ FTIR)	d	6x6

Artificially weathered	Sheet	Dry		PS (confirmed by μ FTIR)	d, w, s	2 x 4
	Sheet	Seawater		PS (confirmed by μ FTIR)	d, w, s	2 x 4
	Sheet	Dry		PE (confirmed by μ FTIR)	d, w, s	2 x 4
	Sheet	Seawater		PE (confirmed by μ FTIR)	d, w, s	2 x 4

Sheet	Dry		PP (confirmed by μ FTIR)	d, w, s	2 x 4
Sheet	Seawater		PP (confirmed by μ FTIR)	d, w, s	2 x 4
Sheet	Dry		PET amorphous (confirmed by μ FTIR)	d, w, s	2 x 4
Sheet	Seawater		PET amorphous (confirmed by μ FTIR)	d, w, s	2 x 4
Sheet	Dry		PET crystalline (confirmed by μ FTIR)	d, w, s	2 x 4
Sheet	Seawater		PET crystalline (confirmed by μ FTIR)	d, w, s	2 x 4

Real samples	Green Buoy	Real		PP (confirmed by μ FTIR)	d, w, s	ND
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Milk bottle Real



HDPE
(confirmed by
 μ FTIR)

d, w, s

ND

Foam Real



PS

d

ND

Toy
placemat Real



PP – PE
(confirmed by
 μ FTIR)

d, w, s

ND

Green
Bottle Real

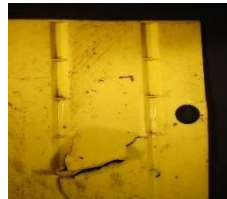


PET
(confirmed by
 μ FTIR)

d, w, s

ND

Yellow
sheet Real



HDPE
(confirmed by
 μ FTIR)

d

ND

Bag dog
food Real



PE
(confirmed by
 μ FTIR)

d

ND

Rope Real








PP
(confirmed by
 μ FTIR)

d

ND

	Shoe	Real		Fluorocarbon (confirmed by μ FTIR)	d	ND
	Bubble wrap	Real		PE (confirmed by μ FTIR)	d	ND
	Foam	Real		PE (confirmed by μ FTIR)	d	ND
	Red sheet	Real		PP (confirmed by μ FTIR)	d	ND
	Cup	Real		PP (confirmed by μ FTIR)	d	ND
The Ocean Cleanup samples	HDPE	Pristine		PE	d	30x30
	Extruded PS	Pristine		Extruded PS	d	30x30

PP	Pristine		PP	d	30x30
PET	Pristine		PET	d	30x30
PVC	Pristine		PVC	d	30x30
PA6	Pristine		PA6	d	30x30
Wood	Real		NA	d	NA

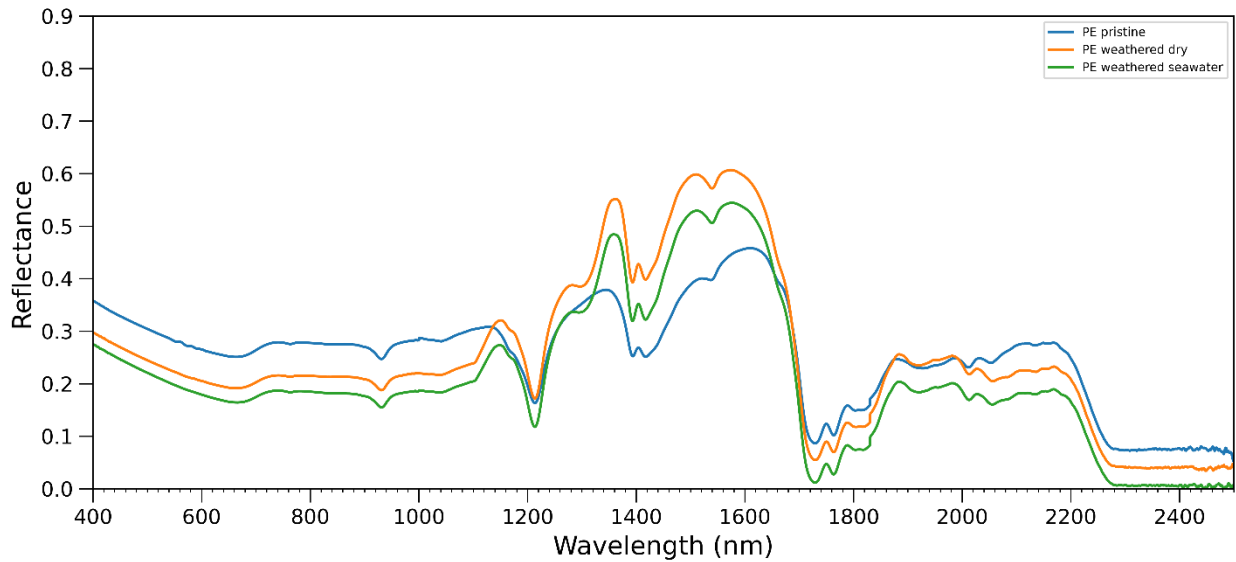


Figure S1. Spectral reflectance of virgin, dry weathered and seawater weathered polyethylene (PE). The spectrum of the virgin sample shows clear absorption features in the SWIR and is relatively flat in the VNIR. Weathering changes the absolute reflectance of the sample.

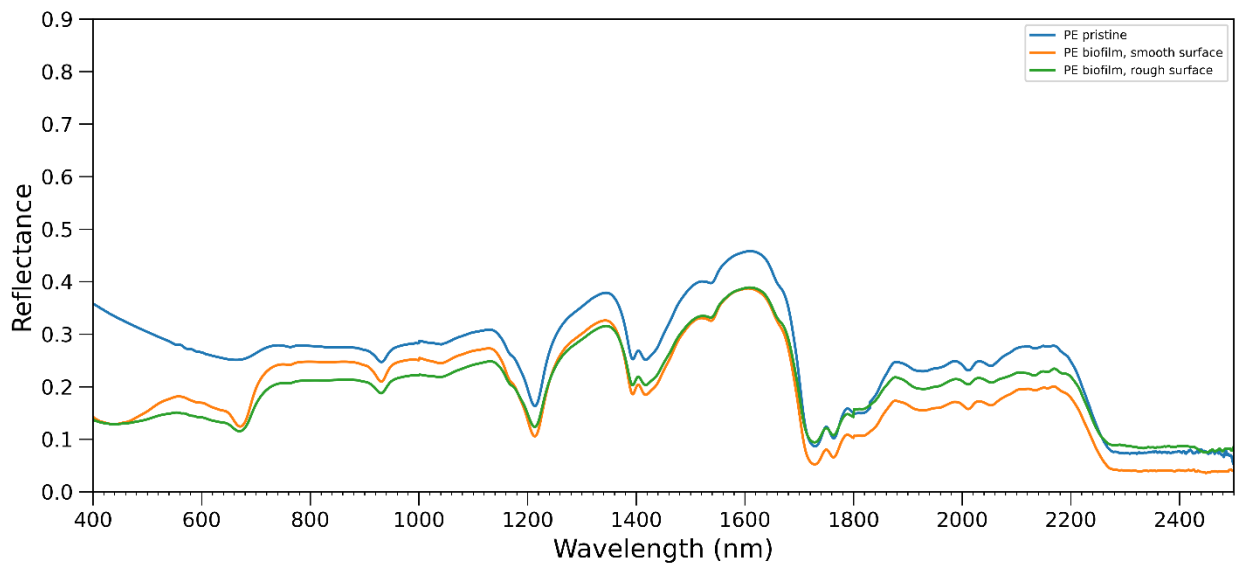


Figure S2. Spectral reflectance of dry biofouled with smooth and rough surface and pristine polyethylene (PE). The impact of biofouling is very clear in the VIS part of the spectrum, resulting in a different spectral shape with peak in the green. After 700nm, we observe a consistent, slight decrease in reflectance for the dry biofilm. For the wet biofilm, we observe a very strong decrease in reflectance and change of the shape of the spectrum.