

**Table S1.** Compounds found at  $t_0$  and after 4 weeks ( $t_0+4w$ ) of aging of the investigated polymers. HDPE: high density polyethylene; LDPE: low density polyethylene; PET: polyethylene terephthalate; PP: polypropylene; PS: polystyrene.

Compounds	Tr (min)	HDPE at $t_0$	HDPE at $t_0+4w$	LDPE at $t_0$	LDPE at $t_0+4w$	PET at $t_0$	PET at $t_0+4w$	PP at $t_0$	PP at $t_0+4w$	PS at $t_0$	PS at $t_0+4w$
Acetone	9,52	X	X	X	X	X	X	X	X		X
Acetic acid, methyl ester	11,49										X
Silanol, trimethyl-	14,23					X	X	X	X	X	X
Pentane, 2-methyl-	14,27							X			
Methacrolein	14,48					X					
Formic acid, 1-methylethyl ester	14,99										
Acetic acid	15,22	X	X	X	X	X	X	X		X	
Pentane, 3-methyl-	15,49							X			
Methyl vinyl ketone	15,79		X		X				X	X	
2,3-Butanedione	16,06										
Butanal	16,32	X		X	X		X				
Propanal, 2-methyl-	16,35							X			
n-Hexane	16,78							X			X
2-Butanone	16,79			X			X		X		X
Furan, 3-methyl-	17,07					X					
Trichloromethane	18,94										
Tetrahydrofuran	19,35	X		X		X	X			X	
Ethyl Acetate	19,36			X					X	X	X
Cyclopentane, methyl-	19,42							X			
Cyclopentene, 3-methyl-	19,91								X		
2-Propanone, 1-hydroxy-	21,79										
Benzene, pentafluoro-	21,92			X	X	X	X	X	X	X	X
Cyclohexane	22,15								X		
Benzene	22,46	X	X	X				X			X
1-Propen-2-ol, acetate	22,54								X		
Furan, 2,3-dihydro-5-methyl-	22,91	X									
Propanoic acid	23,17	X					X			X	
2-Propenoic acid	23,26						X				
2-Pentanone	23,53					X	X		X	X	X
2-Butanone, 3-methyl-	23,55						X				

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Heptane, 3-methyl-	29,32									
Butanoic acid	29,50							X		
Acetylacetone	29,76							X		
2-Butenoic acid, (E)-	29,84							X		
CH3C(O)CH2CH2OH	30,07							X		
2-Hexanone	30,17									X
Toluene	30,18	X								
Pentanal, 2-methyl-	30,18									
Butane, 1-(2-propenyloxy)-	30,18									
2-Pentanone, 3-methylene-	30,29									
1-Methylallyl acetate	30,41									
Cyclopentanone	30,55									X
1,3-Cyclohexadiene, 5,6-dimethyl-	30,57									
2-Butenal, 2-methyl-	30,57									
Propanoic acid, TMS derivative	30,60							X		
3-Penten-2-one, 4-methyl-	30,77									
Furan, 2-methoxy-	30,77				X				X	X
3-Penten-2-one, 4-methyl-	30,77			X						
1,1-Ethenediol, diacetate	30,90							X		
2-Hexanone	30,93		X							
Octane	30,93						X			
Hexanal	30,93			X		X			X	X
2-Butenoic acid, (E)-	31,06					X				
Acetic acid, butyl ester	31,56			X		X				X
Furan, 2,3,5-trimethyl-	31,75							X		
2-Pentanone, 4-hydroxy-	31,94			X				X		
Heptane, 2,4-dimethyl-	32,20						X			
Heptane, 3-methyl-	32,20									
Ethanol, 2-(1,1-dimethylethoxy)-	32,45						X			
Benzonitrile, pentafluoro-	32,68					X				
2-Pentanone, 4-hydroxy-4-methyl-	33,27			X				X		

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2(3H)-Furanone, dihydro-5-methyl-	39,57		X		X				X			
Pentanoic acid	39,84				X							
Heptane, 2,2,3,5-tetramethyl-	39,92											
Octane, 2,2,6-trimethyl-	39,92											
2H-Pyran-2-one, tetrahydro-	39,94											
Hexanoic acid	39,94				X							
1-Heptanol	40,18											
2,4-Pentanedione, 3-ethyl-	40,21								X			
2-Cyclopenten-1-one, 3-methyl-	40,36											
3-Isopropyl-5-methylhexan-2-one	40,46											
Phenol	40,47							X				X
Benzaldehyde	40,54		X	X	X	X	X	X		X		X
2-Butanone, 4-(acetyloxy)-	40,66					X				X		
Octane, 2,2,6-trimethyl-	40,74											
Benzene, 1,2,4-trimethyl-	40,76								X			
Pentanoic acid, 4-oxo-, methyl ester	40,95											X
1,9-Decadiene	41,02											
1H-Pyrrole-2,5-dione	41,10					X		X				
3-Octanone	41,11											
3-Pentenoic acid, 4-methyl-	41,14											X
Benzaldehyde	41,31	X	X									
2-Octanone	41,32											X
Cyclopropane, 1,2-dimethyl-1-pentyl-	41,41											
1-Decene	41,42											
Furan, 2-pentyl-	41,50		X	X	X		X					X
tert-Butylamine, N-ethyl-N-nitroso-	41,55							X				
Heptane, 2,2,4,6,6-pentamethyl-	41,69	X										
Decane	41,80					X		X		X		
Octane, 2,7-dimethyl-	41,81			X								
2-Furanone, 2,5-dihydro-3,5-dimethyl	41,85								X			

Octane, 2,6,6-trimethyl-	41,98											
Octanal	42,01			X	X	X	X	X		X	X	
Decane	42,01	X										
Nonane, 2,6-dimethyl-	42,17							X				
2(5H)-Furanone, 3,5,5-trimethyl-	42,24								X			
1,2-Propanediol, diacetate	42,31								X			
Nonane, 2,6-dimethyl-	42,35							X				
Benzofuran	42,37											X
Heptane, 2,2,4,6,6-pentamethyl-	42,56				X							
Propanoic acid, 2-methyl-, anhydride	42,69											
Benzene, (2-methylpropyl)-	42,70									X		
Benzene, (bromomethyl)pentafluoro-	42,81	X	X	X	X	X	X	X	X	X	X	
Octanal	42,81	X	X									
Heptane, 5-ethyl-2,2,3-trimethyl-	42,82											
Formic acid, heptyl ester	42,94											
Acetic acid, 1-methyl-3-oxo-but- 1-enyl ester	42,98								X			
Tetrasiloxane, decamethyl-	43,23											
Heptane, 2,2,4,6,6-pentamethyl-	43,23											
Acetic acid, (acetyloxy)-	43,30											
2,2,4,4-Tetramethyloctane	43,39											
Formic acid, heptyl ester	43,54											
Octane, 6-ethyl-2-methyl-	43,55				X							
Benzyl alcohol	43,56											X
Octane, 2,6,6-trimethyl-	43,57	X										
6-Heptenoic acid	43,86				X							
Propanoic acid, 2-methyl-, anhydride	43,88											
Hexanoic acid	43,99					X	X					
Nonane, 4,5-dimethyl-	44,08							X				
Benzeneacetaldehyde	44,09						X			X	X	
Heptanoic acid	44,15				X							





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Butanoic acid, 3-hexenyl ester, (Z)-	49,51						
Cyclobutanecarboxylic acid, 3-methylbut-2-enyl ester	49,55	X					
Undecane, 5-methyl-	49,67	X					
Benzothiazole	49,75						X
Benzene, 1,3-bis(1,1-dimethylethyl)-	49,76		X				
1,2-Benzisothiazole	49,76	X				X	
Benzothiazole	49,79		X				
1-Methoxydecane	49,84						
2(3H)-Furanone, dihydro-5-propyl-	49,93		X				
Undecane, 3-methyl-	50,09	X					
1,11-Dodecadiene	50,09						
Octyl chloroformate	50,23			X			
1-Nonanol	50,23						
1-Dodecene	50,23	X					
Undecane, 4,7-dimethyl-	50,37			X			
Oxalic acid, butyl propyl ester	50,39						
Cinnamaldehyde, (E)-	50,40						X
Cyclodecane, methyl-	50,49	X					
Decanal	50,62			X	X		
Undecane, 2,3-dimethyl-	50,64	X					
Undecane, 4-ethyl-	50,64	X					
Undecane, 6-ethyl-	50,94	X					
Dodecane, 2,6,11-trimethyl-	50,98					X	
Dodecane, 2,6,11-trimethyl-	50,98						
Undecane, 3,8-dimethyl-	51,14					X	
Undecane, 4,7-dimethyl-	51,14						
1-Decanol	51,16		X				
Dodecane, 5-methyl-	51,32			X			
2-Undecanone	52,91						
Dodecane, 4,6-dimethyl-	52,97					X	

1-Tridecene	53,69						
Tridecane, 5-methyl-	54,58						
n-Nonylcyclohexane	55,21			X			
Benzene, (1-butylheptyl)-	56,53						
Dodecane, 1-iodo-	56,60						
Hexadecane	56,61	X		X			
Diphenyl sulfide	56,72					X	X
2-Decanone	56,72						
Cyclopropanecarboxamide, N-(3-methylphenyl)-	57,62				X		
Benzoic acid, phenyl ester	57,91						