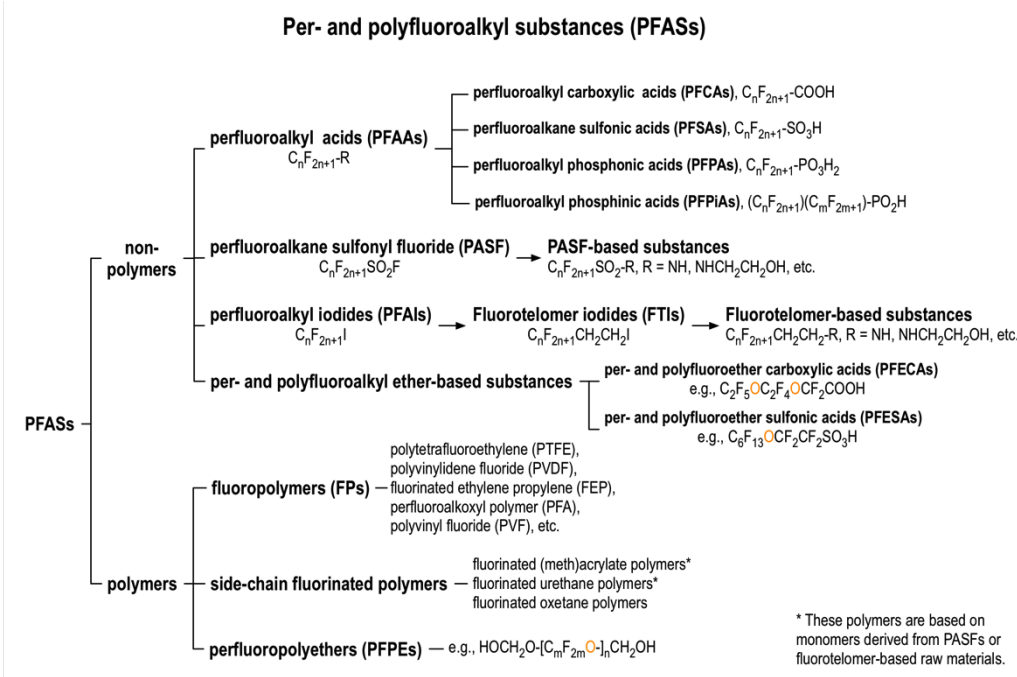
Figure 1: General classification of per- and polyfluoroalkyl substances (PFASs) based on the a commonly agreed terminology for nomenclature of PFASs (Buck et al. 2011); this figure is reproduced from OECD (2013) and updated with new information available (in particular, regarding per- and polyfluoroalkyl ether-based substances).



Among polymeric PFASs, different groups of substances can be differentiated as follows.

[i] Fluoropolymers: These consist of carbon-only backbones with fluorine atoms directly attached to this backbone (e.g., polytetrafluoroethylene or PTFE, polyvinylidene fluoride or PVDF; fluorinated ethylene propylene or FEP; perfluoroalkoxyl polymer or PFA). They are not made from non-polymeric PFASs raw materials (except that perfluorobutylethlyene (PFBE) can be used as a co-monomer in some cases); however, the long-chain PFCAs such as PFOA and PFNA have been used extensively as processing aids in the polymerization process of certain types of fluoropolymers.

[ii] Side-chain fluorinated polymers: fluorinated polymers consisting of variable compositions of non-fluorinated carbon backbones with polyfluoroalkyl (and

possibly perfluoroalkyl) side-chains, which often originate from PASF- or FT-based substances.

[iii] Perfluoropolyethers (PFPEs): fluorinated polymers consisting of backbones containing carbon and oxygen with fluorines directly attached to carbon. PFPEs are not made from PFAAs and PASF- and FT-based substances; nor are these non-polymeric PFASs involved in the manufacturing of PFPEs. However, in some cases, PFPEs are longer-chain homologues of non-polymeric per- and polyfluoroalkyl ether-based substances.

The terminology "long-chain" and "short-chain" is used to distinguish different types of PFCAs, PFSAs and their precursors. The term "long-chain PFASs" refers only to the following PFASs (see OECD, 2013):

[i] PFCAs with 7 and more perfluoroalkyl carbons, such as perfluorooctanoic acid (PFOA or C8 PFCA; with 8 carbons) and perfluorononanoic acid (PFNA or C9 PFCA; with 9 carbons);

[ii] PFSAs with 6 and more perfluoroalkyl carbons, such as perfluorohexane sulfonic acid (PFHxS or C6 PFSA; with 6 perfluoroalkyl carbons) and perfluorooctane sulfonic acid (PFOS or C8 PFSA; with 8 perfluoroalkyl carbons); and

[iii] Precursors that have the potential to transform to long-chain PFCAs or PFSAs in the environment or biota, such as PASF- and FT-based substances.

For PFASs other than PFCAs, PFSAs and their precursors, no official distinction between "long-chain" and "short-chain" homologues has been proposed.