

# Green Chemistry Technology Needs

This list is developed and maintained by the [GC3 Startup Network](#) based on input provided by a selection of manufacturers, brands, and retailers comprising the [GC3 membership](#). It is a living document subject to continued modification. There are no representations or warranties about the completeness, accuracy, or reliability of the information.

Chemical Function	Description	Identifier
<b>Adhesives</b>	Bonding agents without the use of methylene diphenyl diisocyanate (MDI) and toluene diisocyanate (TDI), generally used in paints, coatings, foams, glues, composite woods and flooring	1
	MEK-free primers/adhesives	2
	Reversible/switchable adhesives for applications including recycling/recovery, industrial electronics pick-and-place processes, short-term silicon wafer bonding, feet for climbing robots	3
	Solvent-free, water-based adhesives that do not rely on chloroprene monomer, including applications such as foam to foam, foam to polymer, foam to wood, and metal to metal capabilities in high humidity climate conditions, especially in healthcare	4
	Wood adhesives that do not contain added formaldehyde	5
<b>Battery Technologies</b>	Cobalt-free batteries that are environmentally (GreenScreen® Benchmark 2 or higher) and socially sustainable	6
	EGDME (1,2-dimethoxyethane)-free batteries that are GreenScreen® Benchmark 2 or higher	7
<b>Blowing Agents</b>	Blowing agents for wire and cable insulation without the use of azodicarbonamide (ADC)	8
<b>Chelating Agents</b>	Biodegradable chelating agents for personal care and household products including dishwashing and laundry detergents	9
<b>Coating Materials</b>	Coating materials with temperature dependent thermal properties	10
	Coating materials that do not contain perfluorinated and polyfluorinated compounds	11
	Isocyanate-free polyurethanes	12
	Nano-cellulose materials with improved transparency in coating applications	13
<b>Colorants</b>	Polychlorinated Biphenyl alternatives for pigments that are GreenScreen® Benchmark 2 or higher	14
	Titanium Dioxide pigments with a non-toxic morphology	15

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Chemical Function	Description	Identifier
<b>Conditioning Agents</b>	Alternatives for cationic poly-electrolytes (quaternary ammonium derivatives or polyquaterniums), generally used as conditioning agents for skin and/or hair cleansing products, that are biodegradable and have low ecotoxicity	16
	Hair conditioning agents that are naturally derived	17
	Mineral oil alternatives that are biodegradable and/or natural origin oils	18
	Non-silicone ingredients for beauty and personal care products	19
<b>Corrosion Inhibitors</b>	Environmentally compliant alternatives to replace chromates and other heavy metals	20
<b>Cross Linking Agents</b>	Low toxicity cross linking agents for polymers	21
<b>Elastomers</b>	Alternative to silicones in personal care products	22
<b>Flame Retardants</b>	Non-halogenated flame retardants for polyolefins/ thermoplastics for a variety of applications including indoor and outdoor furniture, electronics, and non-wovens and other textile fabrics	23
<b>Foaming Agents</b>	Biodegradable alternatives for sodium lauryl ether sulfate (SLES) for cleaning products	24
<b>Fragrances</b>	Fragrance raw materials that are non-sensitizing with a low risk of biodiversity loss	25
<b>Fungicides</b>	Bio-inspired adjuvants for fungicides that have a benign toxicological profile	26
<b>Hardening Agents</b>	Alternatives to Bisphenol A for use in the manufacture of polycarbonate and printed circuit board substrates that are GreenScreen® Benchmark 2 or higher (not Bisphenol S or Bisphenol F)	27
<b>Plasticizers</b>	Non-phthalate plasticizers for electronic products (e.g., cords, cables); cleaning products; beauty and personal care products; office products; home improvement (e.g., flooring, sealants, paints, etc.); and textiles	28
<b>Polymers</b>	Non-halogenated V-0 rated* injection molded plastics *UL94 Flammability Testing Standard and Ratings	29

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Chemical Function	Description	Identifier
<b>Preservatives &amp; Antimicrobials</b>	Antimicrobials and preservatives that are non-sensitizing at levels needed for preservation for personal care and cleaning products, baby products, office products, and electronics (e.g., keyboards, mouse)	30
	Antimicrobials or technologies that are non-biocidal (do not require registration per the Biocidal Products Regulation [BPR, Regulation (EU) 528/2012])	31
<b>Recycling Technologies</b>	Recyclable latex for carpet backing	32
	Recycling technologies for textile blends, including those containing spandex	33
<b>Resins</b>	Bio-based building blocks (monomers) for resin synthesis – particularly acrylates	34
	Bio-based resin technologies for high physical durability coatings	35
	Water-based resins for low temperature coating applications	36
<b>Rheology Modifiers &amp; Film Formers</b>	Biodegradable alternatives for polyacrylate-based chemistry, generally used as rheology modifiers or film formers for household and personal care products	37
<b>Solvents</b>	Alternatives to N-Methyl-2-Pyrrolidone (NMP) that do not include $\gamma$ -Butyrolactone (GBL), Dimethyl Sulfoxide (DMSO), or Dimethylacetamide (DMAc) for applications including wafer nano manufacturing, paint and ink removers, and graffiti removers	38
	Solvents, especially those with applications in formulated consumer products, coatings, textiles	39
<b>Surfactants</b>	Surfactants for laundry products that can remove hydrophobic soils	40
	Surfactants that are amphiphilic, especially alternatives to ethoxylated materials	41
	Surfactants that are anaerobically biodegradable	42
	Surfactants that are bio-based with low aquatic toxicity for cleaning and personal care products	43
<b>UV Filters</b>	UV Filters/ light stabilizer ingredients with low aquatic toxicity	44
<b>Water &amp; Stain Repellants</b>	Perfluorinated and polyfluorinated compound-free (PFC-free) water and oil repellent surface treatments for apparel and footwear, carpeting, food packaging, indoor and outdoor furniture, and home improvement (e.g., paints and coatings)	45
	Non-silicone water repellants for use in cosmetics, such as mascara	46