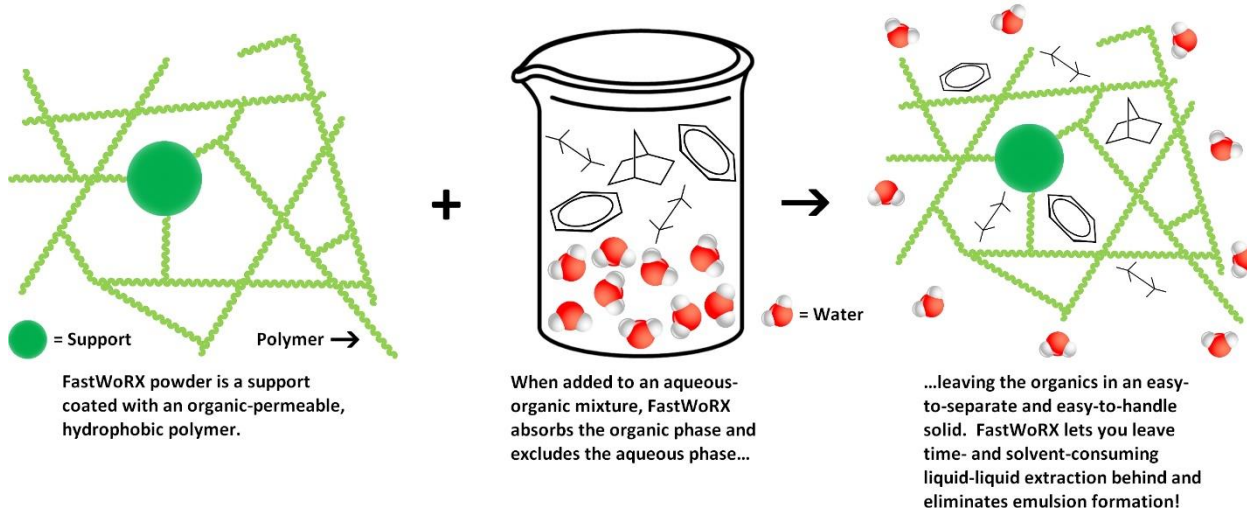


The FastWoRX™ Concept

Faster Chemistry's FastWoRX™ products are made from various substrates coated with a polymer. The coating is hydrophobic and absorbs most organics that have reasonably low solubility in water. The idea behind FastWoRX is quite simple. The broad affinity of the polymer coating for organic compounds allows those compounds to be absorbed into the polymer, similar to a sponge, while excluding water. This forms a new type of phase – a “solid solvent” phase – in which the absorbed organics are immobile in contrast to the usual liquid solvent. This enables extraction of organics from the aqueous phase by a filterable or easy-to-handle solid versus extraction by a liquid, as has been done for over 150 years in the well-known liquid-liquid extraction process. The target compounds can then be eluted by a suitable organic solvent. The process can easily be automated versus LLE.

FastWoRX products are non-hazardous and reusable.

The FastWoRX Concept



How does FastWoRX Extraction compare with other extraction techniques?

FastWoRX Extraction (FE) and Liquid-Liquid Extraction (LLE) are quite similar in terms of their separation mechanism. Both are governed by the partition ratio — the ratio of concentrations of a compound in each phase of two immiscible phases at equilibrium. The main difference between FE and LLE is that separation is between two liquid phases in LLE and between a liquid phase and the FastWoRX solid phase in FE. Because FE uses easily separable solids instead of a solvent, it is faster, greener, safer and less labor intensive than LLE. An additional benefit is that the FastWoRX solid phase prevents emulsion formation. Another advantage of FE over LLE is that FE can be automated and multiple samples processed simultaneously.

The FE process is also similar to Solid Phase Extraction (SPE) in terms of handling. SPE is based on adsorption — the surface of the SPE resin substrate is treated with various compounds to give an affinity for certain classes of target compounds present in the aqueous phase. The SPE resin best suited for a given target compound is found on a case-by-case basis. In contrast, FE is based on the broad absorption of

organics – a FastWoRX product absorbs most organics into the bulk volume of its polymer coating. This gives FE two big advantages over SPE – near universal applicability for the usual SPE applications using a single product and capacity that is not limited by surface area. Therefore, FE can practically separate mixtures at scales ranging from milligrams to kilograms and beyond.

FastWoRX Extraction combines the flexibility and scalability of LLE and the ease of handling of SPE – the best of both worlds! All the benefits of our FE technology – decreased extraction times and automation of your purification processes – will reduce your cost of doing extractions. Moreover, solvent use and exposure will significantly decrease, further reducing your costs and simplifying and greening your chemistry.

What solvents can be used with FastWoRX?

FastWoRX works with most of the solvents commonly used for conducting reactions and liquid-liquid extractions, such as ether, dichloromethane and ethyl acetate. Ideally, the solvent should have low water solubility.

What are some applications for FastWoRX?

Fast chemical reaction work-up – During the discovery stage to develop pharmaceuticals, agrochemicals and other new materials, a large number of compounds need to be synthesized in quantities from milligrams to grams. The bottleneck in synthesis is the work-up and purification of the reaction products rather than the actual reactions. Typically, after a reaction, a time-consuming LLE work-up procedure is needed. FastWoRX makes work-up easy and greener. Production-scale – kilograms to tonnes – chemistry can realize these benefits also.

DNA, RNA and protein separations – The phenol-chloroform technique is biochemistry's equivalent of LLE. Emulsion formation is often a problem. This process is especially problematic when a large number of samples need to be processed. FastWoRX eliminates emulsion formation and would be ideal for this application.

Extraction of organic compounds from urine, blood serum, water, beverages, soil and tissue – Analysis of organic compounds in urine, blood, water, beverages, soil and tissue is crucial in clinical, food, environmental and forensic testing and other applications. The time-consuming part of these analyses is usually sample preparation – many of these analyses still use traditional LLE. Numerous commercial SPE products are designed to speed-up the process. FastWoRX extraction is ideal to replace time-consuming LLE and offers higher capacity and efficiency than SPE in many applications.

Filter for the extraction of organic compounds from gases – FastWoRX products can extract volatile organic compounds (VOCs) from the gas phase. Analysis of volatile organic compounds is important in air quality control, medical diagnosis and national security. A FastWoRX product alone or loaded with an appropriate solvent would be ideal to collect target compounds.