



Case Study: Sustainable Chemistry

07-2017

About Mergeflow

What We Do

Our innovation analytics platform helps global technology leaders create and prevent strategic surprise.

Large technology organizations and investors worldwide use Mergeflow to discover products, research, patents, start-ups, and experts associated with emerging, innovative technologies.

Our customers operate in and across diverse industry sectors.

Why Mergeflow

- Mergeflow enables automated, real-time, and continuous insight into innovations and technologies, across a range of different signals (patents, scientific publications, news, funding events, market news, etc.).
- Advanced analytics, machine learning algorithms, and visualizations let you focus on data interpretation rather than data collection and preparation.
- Mergeflow is a ready-to-use standard software product that can be extended to accommodate customer-specific use cases.
- We are independent. For instance, we do not charge finder's fees etc., and our software platform does not track what you do.

Case Study: Sustainable Chemistry

Executive Summary

Using Mergeflow's innovation analytics software platform, we investigated companies, markets, technologies, and experts in the area of "Sustainable Chemistry". Insights and discoveries include:

- Relatively large number of recent VC investments.
- Substantial public R&D funding of SMEs in sustainable chemistry.
- Strong increase in Scientific Publications, starting in late 2013.
- Only moderate coverage of the topic in Industry and Technology News.
- China is a powerhouse in sustainable chemistry patents.

Method

Using Mergeflow's innovation analytics software platform, we investigated companies, markets, technologies, and experts in the area of "Sustainable Chemistry".

Names of companies, people, and technologies, as well as financial data (e.g. VC funding events) are extracted automatically by Mergeflow's analytics engine.

Over the course of a typical week, Mergeflow collects and indexes the following updates:

- 30,000 scientific publications
- 18,000 patent publications from worldwide patent offices
- 15,000 industry news
- 12,000 financial and investor news
- 10,000 tech & science news
- 10,000+ updates for customer-specific data repositories
- 1,500 startup activity news
- 1,000 crowdfunding and open innovation updates
- 400 publicly funded research projects worldwide
- 250 technology licensing offers from worldwide R&D institutions

Mergeflow continuously adds these updates from various sources on the web and other databases, and adds them to its existing data repositories.

Below is a summary of our results, along with screenshots from mergeflow.net's interactive visualizations.

Companies

Emerging Companies (SMEs and Startups)

From worldwide news on companies, markets, and technologies, Mergeflow extracts the names of companies that received VC funding, as well as the funding amount, the date, and the investors.

Some companies that recently received venture funding:

Date	Funded company	Amount (USD)	Context
20 July 2017	Arzeda	12,000,000	...Last week, the lab published research in the journal Science demonstrating a new method for large-scale design and testing of novel proteins. Researchers led by Gabe Rocklin used computational protein design, gene synthesis, and other techniques to analyze more than 15,000 new mini-proteins and othe...
15 June 2017	Twist Bioscience	27,000,000	...At Twist Bioscience, our expertise is accelerating science and innovation by leveraging the power of scale. We have developed a proprietary semiconductor-based synthetic DNA manufacturing process featuring a high throughput silicon platform capable of producing synthetic biology tools, including gen...
4 April 2017	Anomera	1,250,000	...Anomera is a spin-out from McGill University, Montreal, where the company benefited from McGill's discovery ecosystem and its active commitment entrepreneurship. Anomera has advanced strongly from its close association with one of its strategic partners – a globally recognized market leader in cosme...
27 March 2017	Twist Bioscience	33,000,000	...At Twist Bioscience, our expertise is accelerating science and innovation by leveraging the power of scale. We have developed a proprietary semiconductor-based synthetic DNA manufacturing process featuring a high throughput silicon platform capable of producing synthetic biology tools, including gen...
3 March 2017	Boragen	10,000,000	...AgTech Accelerator, the unique startup accelerator vehicle dedicated to emerging agricultural technologies, today announced the launch of its first AgTech startup, Boragen Inc., with a \$10 million Series A financing round. Boragen is developing a novel synthetic chemistry platform, initially focusin...
2 February 2017	Opti	5,500,000	...Urban stormwater management represents one of the most pervasive and significant environmental issues in the United States. According to the U.S. Environmental Protection Agency, nearly 850 billion gallons of stormwater pollutants are discharged into waterways each year and over 7,000 communities fa...
17 November 2016	T-REX	10,000,000	...Forward-looking Statements Except for the historical information and discussions contained herein, statements contained in this release may constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Our forward-looking statements are subject t...
13 September 2016	Crop Enhancement	8,500,000	...Founded in 2011 by David Soane, Ph.D., and led by Kevin Chen, Ph.D., CEO, Crop Enhancement is commercializing a new set of environmentally friendly chemistry formulations that enable growers to sustainably increase crop yields. In order to boost crop yields in North America, Southeast Asia, Greater...
19 January 2016	Twist Bioscience	61,000,000	...Backers included ARCH Overage Fund, Merieux Developpement, Cormorant Asset Management, Fidelity Management and Research Company and Foresite Capital Management and additional investors ARCH Venture Partners, WuXi Corporate Venture Fund, Illumina, Nick and Joby Pritzker (through their family's firm T...
16 December 2015	Blue River Technology	17,000,000	...Blue River Technology produces revolutionary robotic systems that precisely observe and treat each plant in a field. The company's technology reduces the amount of chemicals used in agriculture by up to 90 percent while capturing valuable plant-by-plant data. Currently, farmers are limited to equipm...
19 August 2015	Agrivida	23,000,000	...Agrivida, Inc., headquartered in Medford, Mass., is the global commercial leader in developing integrated enzyme solutions for the animal nutrition and health, energy and consumer products industries. The company has entered into research and development agreements with the U.S. Department of Energy...

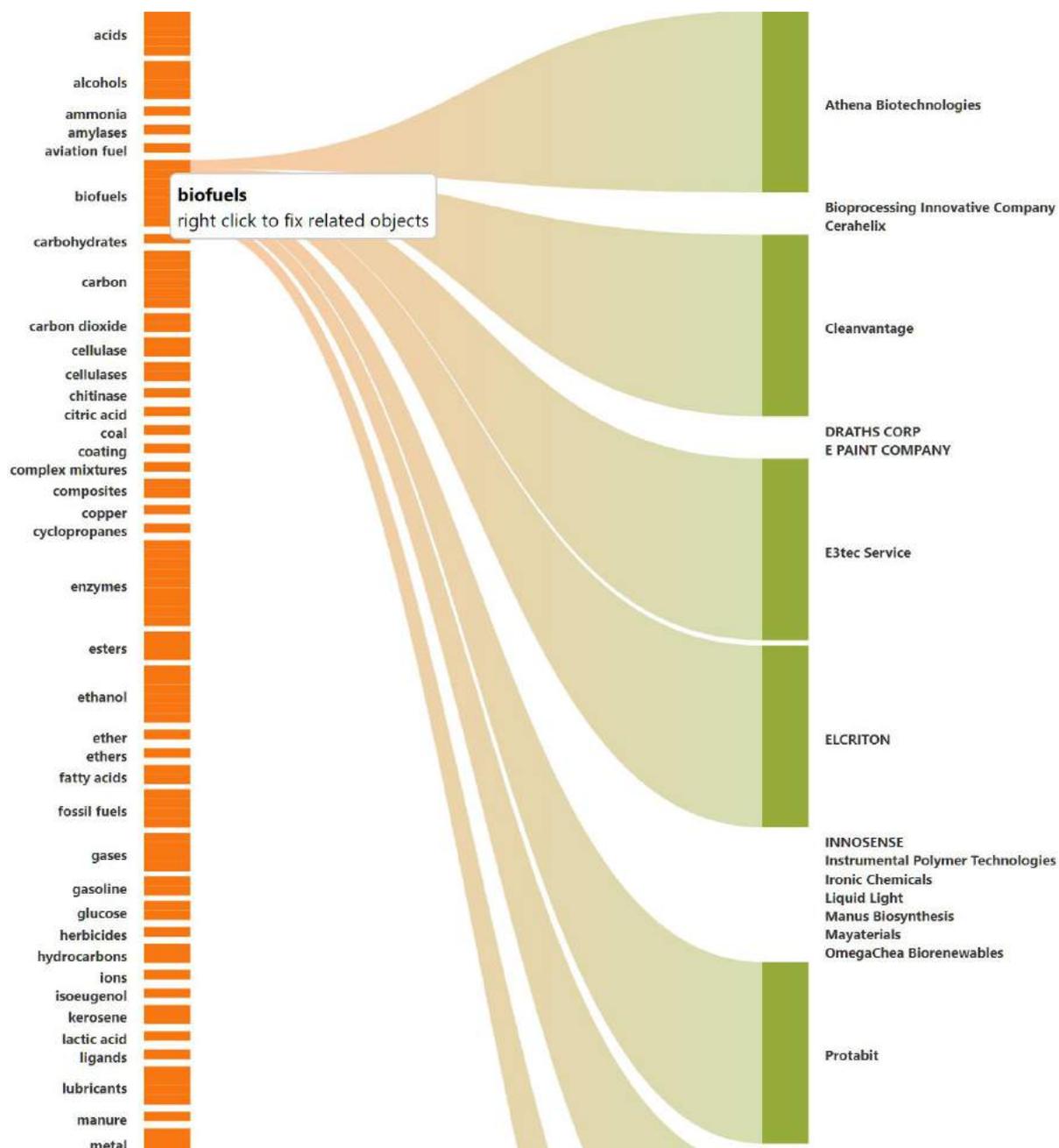
Mergeflow has a dataset of ca. 250,000 crawled company websites worldwide. Here are some “sustainable chemistry” companies from this dataset:

- <http://www.rivertop.com/> - *Revolutionizing Chemistry: We're designing sustainable solutions from proven chemistry and renewable resources.*
- <https://sustanalyze.com/> - *A data driven software to increase R&D efficiency and accelerate development of sustainable chemical products and processes.*
- <http://enerkem.com/> - *Setting a new global standard in waste management, biofuels and chemicals.*
- <http://bluemarblebio.com/> - *Our mission is to provide novel ingredients, solutions, and services for the economy of today and tomorrow.*

Companies with public R&D funding

Mergeflow continuously scans publicly funded R&D projects. This includes projects funded by various US federal funding programs (e.g. SBIR), EU CORDIS, Innovate UK, and others.

As an example, the following page shows some biofuels companies (SMEs) that received SBIR funding. Mergeflow automatically extracted the company and material names from the research project descriptions. In mergeflow.net, the visualization is interactive. This allows the user to zoom in on companies and materials.



Biofuel companies (SMEs) that received SBIR research funding.

Technologies available for licensing

Mergeflow continuously scans hundreds of databases worldwide that contain descriptions of technologies available for licensing. These technologies are out-licensed by universities and other R&D institutions.

Overall, Mergeflow identified 93 technology offerings in the area of “sustainable chemistry”. Here are some recent examples:

A Novel Electrospinning Method to Generate Few-Micro and Sub-Micro Thick Polymeric Fibers from Polymeric Particles (University of Kentucky)

...The new method uses polymer particles – as opposed to bulk polymers – and polymer volumes confined to openings in a perforated sheet, and it shows how reducing the dimension of these particles or polymer volumes corresponds to a reduced diameter fiber. The polymer is melted via direct heating as an...

<http://www.flintbox.com/public/project/30925/>

Making Plastic from Pine Needles (University of Bath)

...An innovative, renewable plastic material made from pine needles could offer an alternative to petroleum-based plastics. Currently, degradable polyesters are mixed with the rubbery polymer caprolactone to be made more flexible, but since caprolactone is made from crude oil, the material is not compl...

<https://www.ideaconnection.com/new-inventions/making-plastic-from-pine-needles-11534.html>



Real-time alert

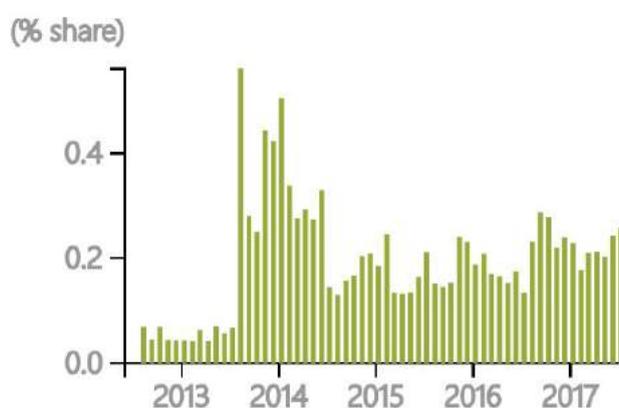
You can subscribe to an alert feed (RSS) that reports the latest “sustainable chemistry” technology offerings here (just add the URL to a feed reader such as Feedly, available for free at <https://feedly.com/>):

<https://mergeflow.net/profiles/demo/search/documents?format=rss&apikey=29ea93dd-9aa4-410a-9e38-f4506173391f&q=sustainable+NEAR10+chemistry%7csustainable+NEAR10+chemical%7csustainable+NEAR10+chemicals%7cgreen+NEAR5+chemistry%7cgreen+NEAR5+chemical%7cgreen+NEAR5+chemicals&sp=2687&tagcat=Organization&tagcount=60>

Academia

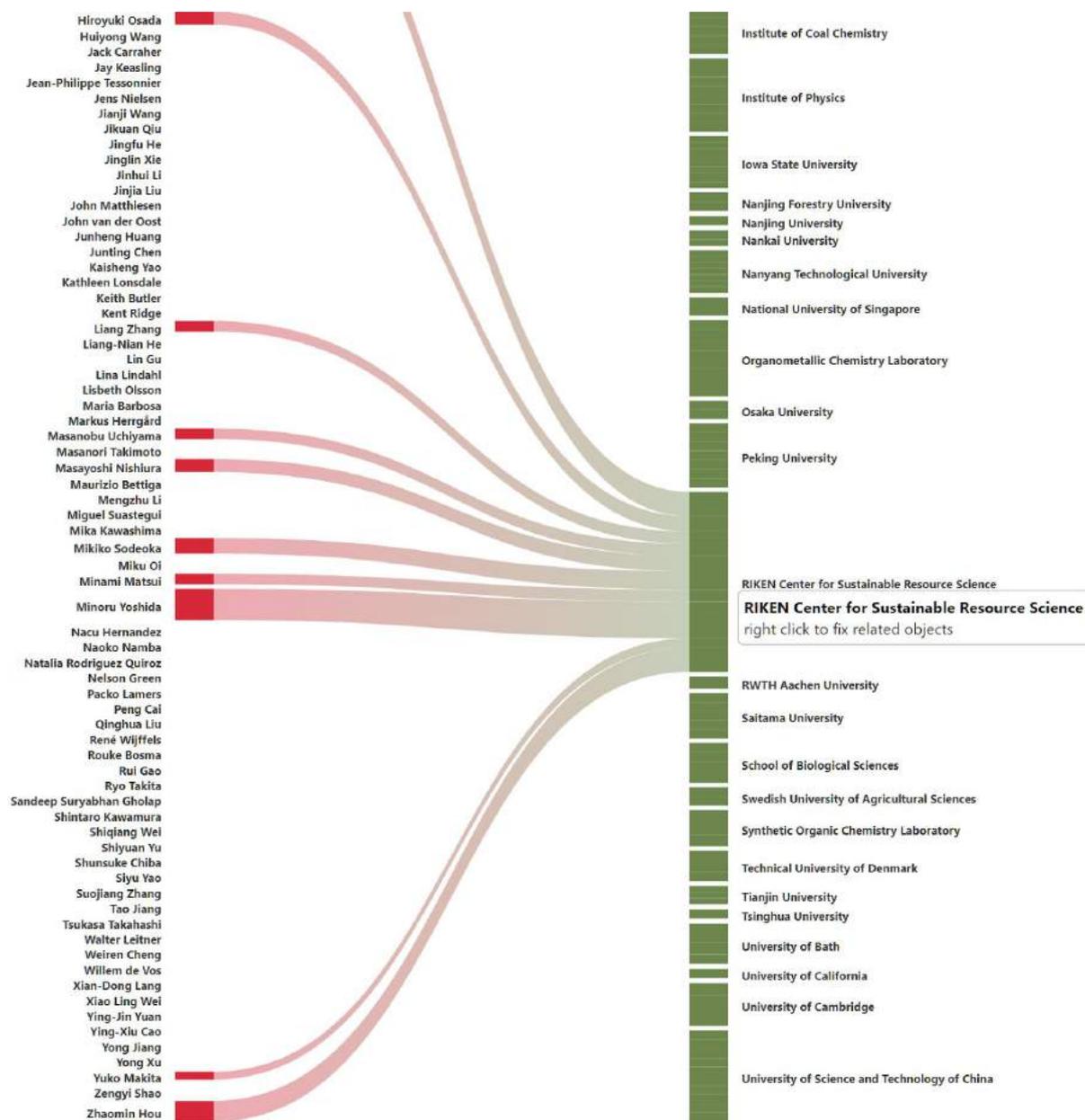
On average, Mergeflow collects and indexes ca. 30,000 new scientific publications every week. Sources are worldwide scientific publications and databases.

Directly related to sustainable chemistry, Mergeflow identified more than 10,000 research publications. Over the last five years, the share of research publications directly related to sustainable chemistry has been rising, particularly since 2013::



From the publications, Mergeflow automatically extracts names of authors and the institutions with which the authors are affiliated. This includes names of new, never-before-seen authors and institutions.

The next page shows a screenshot of an interactive visualization in Mergeflow that relates scientists and the organizations with which they are affiliated.



Scientists affiliated with Japan's RIKEN Center for Sustainable Resource Science.

Technology Blogs

From worldwide technology blogs, Mergeflow identified several hundred blog posts that relate to sustainable chemistry.



Real-time alert

In order to see the most recent blog posts on sustainable chemistry, you can subscribe to an alert feed (RSS) below (just add the URL to a feed reader such as Feedly, available for free at <https://feedly.com/>):

<https://mergeflow.net/Profiles/demo/search/documents?format=rss&apikey=29ea93dd-9aa4-410a-9e38-f4506173391f&q=sustainable+NEAR10+chemistry%7csustainable+NEAR10+chemical%7csustainable+NEAR10+chemicals%7cgreen+NEAR5+chemistry%7cgreen+NEAR5+chemical%7cgreen+NEAR5+chemicals&sp=3178&tagtype=custom&tagcount=60>

Markets

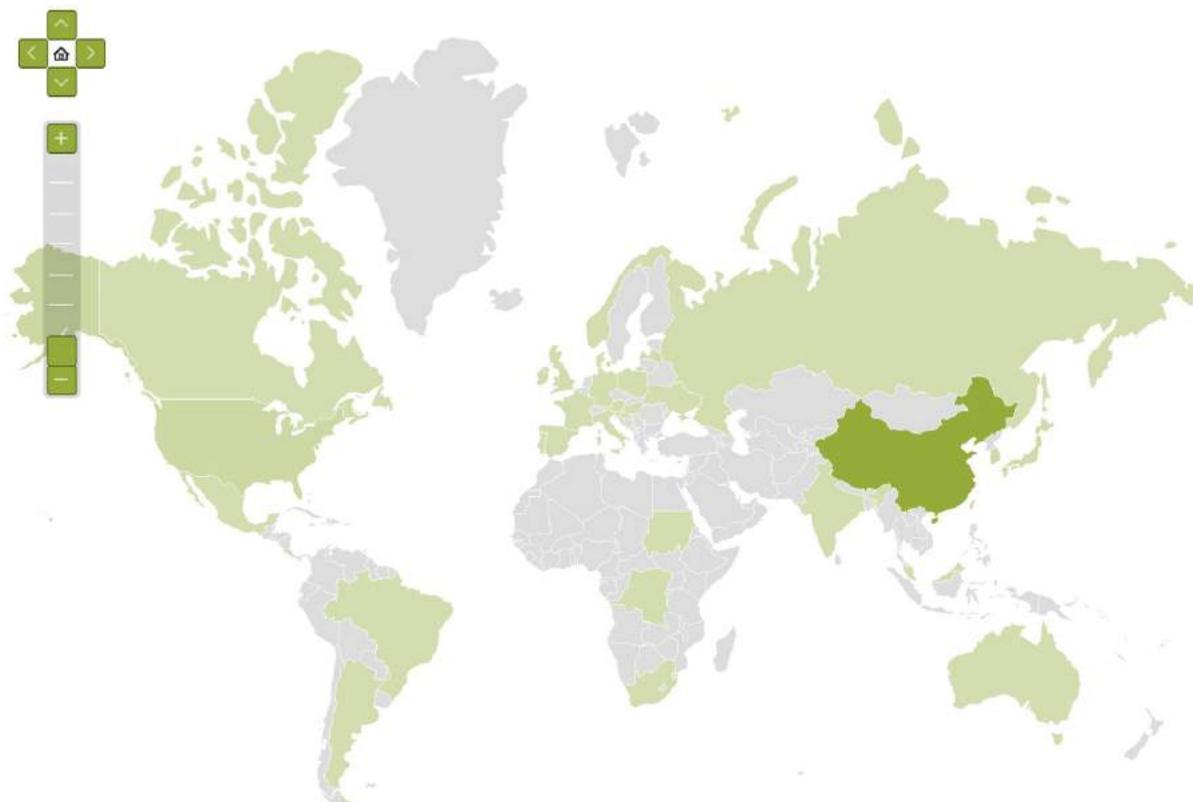
From worldwide financial and industry news, Mergeflow automatically extracts market segments, as well as their estimated sizes and growth rates (CAGRs). Shown below are the largest extracted market segments, sizes, and CAGRs related to sustainable chemistry (sorted by estimated market sizes in 2017):

Market segment	↑↓ CAGR (%) ↑↓	2014	↑↓ 2017	↓↑ 2023
global renewable chemicals market	10.6	46,745.03	69,944.88	115,752.81
global water treatment chemical market	3.4	25,955.54	29,669.64	35,068.32
Global Biological Organic Fertilizer Market	13.3	12,952.08	21,343.18	39,848.19
global soy-based chemicals market	7.5	10,873.21	14,520.84	20,846.54
derivatives market	5.6	5,559.86	6,913.84	9,079.02
global biopolymers market	17.0	3,480.96	6,522.92	14,301.17
global mass spectrometry market	8.7	4,239.30	5,918.51	8,981.73
global bio-based platform chemicals market	11.0	3,488.07	5,295.14	8,922.62
global microfluidic device market	22.8	1,880.31	4,275.86	11,940.31
global high pressure pumps market	3.2	2,189.92	2,483.98	2,907.68
global green chelates/natural chelating agents market	5.7	1,657.64	2,072.28	2,739.33
glufosinate market	9.3	1,153.04	1,642.59	2,556.45
Global Aerogel market	32.6	294.10	909.22	3,727.23

Patents

Mergeflow collects patent publications from all worldwide patent offices. From these patent publications, Mergeflow then extracts companies, inventors, technologies, and other information.

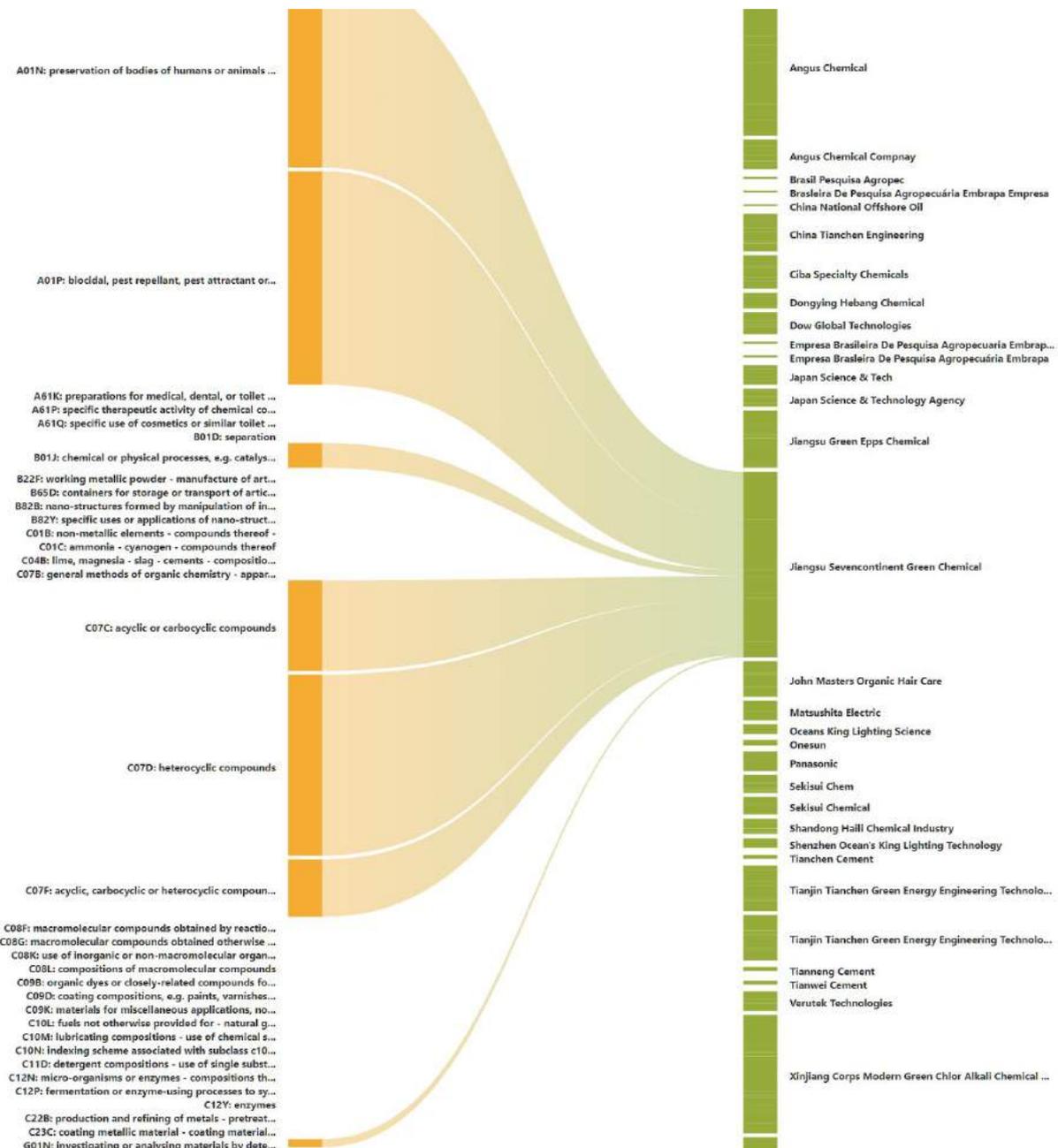
The world map below shows how patent filings in the area of sustainable chemistry are distributed globally. Notice the strong presence of China:



Below are the names of the companies with the most sustainable chemistry patents:

Accela Chembio Alliance Sustainable Energy **Angus Chemical** Angus Chemical Compnay
 Changchun Applied Chemistry Chengdu Haitian Green Chemical Technology Res Ct China Tianchen Engineering
 Ciba Specialty Chemicals Dainippon Ink & Chem Dainippon Ink & Chemicals Dongying Hebang Chemical
 Dow Global Technologies Downon Green Chemical Foshan Gaoming Green De Chemical Gansu Jinshi Chemical
 Green Chemical Hefei Longfa Packing Japan Science & Tech Agency Japan Science & Technology Agency
 Jiangsu Green Epps Chemical Jiangsu Qizhou Green Chemical Jiangsu Seven Continent Green Chemical
Jiangsu Sevencontinent Green Chemical John Masters Organic Hair Care
 Matsushita Electric Oceans King Lighting Science Panasonic Sekisui Chem Sekisui Chemical
 Shandong Haili Chemical Industry Shenzhen Ocean's King Lighting Technology Taicang Hushi Reagent
 Tianchen Cement Tianjin Bokni Technology Development
 Tianjin Tianchen Green Energy Engineering Technology Res & Dev
 Tianjin Tianchen Green Energy Engineering Technology Research & Development Tianneng Cement Tianwei Cement
 Xinjiang Tianye Yancheng Green Chemicals

Zooming in on Jiangsu Sevencontinent Green Chemical (<http://www.sevencontinent.com/en/>), the company with the most patents, we see the following distribution of their patents across patent classes (the height of the orange bars indicates the number of patents in a class; e.g. Jiangsu holds more patents in class *A01P* than in class *B01J*):



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