Ivey International Takes a Chemistry-Driven Approach to TRANSFORMING ENVIRONMENTAL REMEDIATION

Environmental remediation has always been a challenging field, often relying on physical, biological and chemical methods, which can often prove inefficient and time-consuming. Physical methods, such as excavation, pump-and-treat, and multi-phase extraction are often expensive and disruptive to sites, while biological methods, such as bioremediation, use microorganisms to break down pollutants. These processes, however, can be slow and less effective for certain types of contaminants. Despite these efforts, many traditional approaches have limitations, including long timelines and incomplete contaminant removal, making the search for more effective solutions crucial.

One chemist, however, is taking, not only an innovative perspective on remediation, but a synthetic, organic, chemistry-driven approach that is quickly changing the game in remediation. George "Bud" Ivey, the innovator behind the development of selective phase transfer molecules, took some time to share his insights, revealing a fascinating journey from concept to global impact, and his vision for the future of environmental remediation.

Understanding Environmental Remediation

To understand the significance of Ivey's work and its relevance, it's important to grasp the concept of environmental remediation which, put simply, involves the removal of pollutants or contaminants from environmental media such as soil, groundwater, sediment, or surface water. These pollutants, which can be harmful to human health and the environment, require systematic methods to eliminate or neutralize their impact. Traditional remediation techniques include physical, biological, and chemical methods, which involve adding reagents, or removing substances to neutralize contaminants. Despite these efforts, many traditional approaches have significant limitations, including long timelines and incomplete contaminant removal, and ongoing legal liability, making the search for more effective solutions crucial.

Before and After Surfactant Enhanced Remediation

The Genesis of a Chemistry-Driven Approach

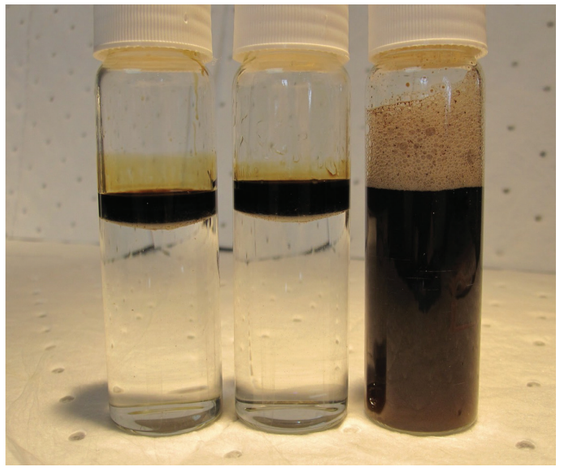
"I started working in the field in the late 1980s watching people use various techniques for remediating contaminated sites, including physical, chemical, biological, and they weren't having a high degree of success," said Ivey, whose background in synthetic, organic chemistry provided him with a unique perspective. "I was looking at the contaminated sites differently because I had a fundamental perspective on organic chemistry others did not have."

This realization led Ivey to explore why traditional methods were falling short. He discovered that a significant issue was the solubility and phase behaviour of the contaminants – or rather, the lack thereof.

"If the oils are stuck on the soil (called sorption), it becomes challenging for physical, bacterial, and/or chemical methods to break it down very easily," he explained.

To tackle this issue, Ivey developed what he now defines as selective phase transfer molecules: "These molecules have an affinity for different types of oil, and can lift it off the surface, making it much more available for remediation, such as bacterial or chemical treatment methods."

It was this fundamental improvement in physical, biological, and chemical reaction kinetics that marked the beginning of Ivey's innovative journey.



IVEY's Surfactants Making Floating Oils More Available For Remediation

From Concept to Global Impact

The initial success of these molecules sparked the creation of Ivey's first start-up in October 1993, and by 1998, he was already in the process of filing his first patents.

"I decided I was going to look at environmental technology development as the direction in which I wanted to go," Ivey said.

With his innovations quickly gaining traction, particularly in the United States, Ivey soon expanded his business model into markets in Australia and Europe, among other countries.

For three decades, Ivey would then put all his focus into his technology with the goal of significantly reducing these long timeframes, prohibitive costs, toward an option for closing sites in one to two years more consistently. His approach not only shortened remediation times, but also transformed the company's business model.

"We became primarily a company that exports innovative technologies globally that could improve most any remediation process we were trying," he said.

Today, Ivey International Inc. is recognized globally, with more than 3,500 projects, taking him to more than 65 countries.

36 IBC of IVEY's Surfactant Remediation Product For Foreign Client

Tackling Persistent Contaminants

But perhaps among the most pivotal moments in Ivey's career came when a U.S. EPA paper (USEPA 542-R-18-002, May 2018) evaluated 30 contaminated sites and found that traditional remediation methods could take anywhere from three to 27 years, with an average of eight years.

"I wasn't happy with these prevailing limitations," he said. "And I was thinking: 'We can do better than eight to 27 years!' That was my attitude."

Persistent contaminants, such as petroleum hydrocarbons, chlorinated solvent, and PFAS, have proven to be a significant challenge in environmental remediation globally. These substances do not dissolve well and tend to stick to surfaces, further complicating their remediation through traditional methods. Ivey's selective phase transfer molecules, however, have addressed this issue by enhancing the solubility and mobility of contaminants, facilitating their removal via physical, biological, and/or chemical means.

"Imagine you have oils that stick on surfaces, and if you're trying to do a biological process, the bacteria can't desorb it. This greatly limits their capacity to break it down," he said.

So what is Ivey's technologies (Ivey-sol®, DECON-IT® and PFAS-SOL®) solution? Using phase transfer molecules to lift the oil off the soil or surfaces, making it more accessible for decontamination treatment. "Once it's in a solution, we can physically pump it out, bacteria can mineralize it, and/or we can use chemical processes to break it down."

Ivey's innovative products and method addresses critical barriers in traditional remediation techniques, improving efficiency and effectiveness, and according to Ivey, makes contaminants much more treatable.

"This is particularly effective for dealing with substances that are otherwise difficult to dissolve and remove from the environment, leading to our latest technology to treat PFAS." he said.

A Global Impact

The impact of Ivey's technology is far-reaching. With more than 20 international patents and trademarks, and numerous awards, including the 2020 Enterprise Technology Award and the 2019 Environmental Business Journal Award, and the Globe Award, their first in 2006, among many others and too long a list to detail within these pages, these innovations have set a new standard in environmental remediation.

The company's global reach is a testament to its technology's adaptability and success. "I've been to over 65 countries, all related to work," Ivey boasted, noting that his extensive travel is not just about expanding the business, but also about understanding different environmental challenges and tailoring solutions to meet them.

In fact, Ivey International Inc. has grown into a global leader, recognized for its innovative solutions and impactful results across thousands of contaminated sites worldwide.

Challenges and Triumphs

Introducing innovative technology in a field resistant to change is no small feat. Initial skepticism was a significant hurdle that Ivey had to overcome.

"People would look at me like, 'What are you talking about? You don't make sense,' he said. "But that was because they didn't understand the involved chemistry."

Ivey's persistence, however, and demonstration of efficacy and work ethic would gradually win over his skeptics.

The real triumph came from seeing consistent results with sites that traditionally took decades to remediate being closed in a small fraction of that time.

"All of a sudden, these sites that were known to take 10-plus years started getting closed inside one to two years consistently," he said.

This level of success not only validated Ivey's innovative technology, but also solidified the company's reputation as an innovative leader in the field of remediation.

Looking Ahead

Despite the significant progress, there is always room for improvement and innovation with Ivey noting that his focus for the future remains on pushing the boundaries of what's possible in environmental remediation. This involves refining existing technologies, and developing new solutions to address emerging contaminants, including PFAS and environmental challenges.

The commitment to innovation and excellence drives his company's efforts, ensuring they remain at the forefront of the industry.

"We aim to continue setting new standards and making a lasting positive impact on the world," he said.

Reflecting on the Journey

The journey from a chemistry-driven concept to a globally recognized technological innovator highlights the transformative power of pioneering thinking. By leveraging a deep understanding of fundamental chemical interactions, Ivey has seen his work and approach revolutionize environmental remediation, offering effective solutions where traditional methods have fallen short.

Reflecting on his journey, Ivey emphasized the importance of persistence, noting how instrumental having a strong foundation in organic chemistry and geological engineering, has been for him.

From tackling persistent contaminants to achieving global impact, the story of this chemistry-driven approach is one of challenges, triumphs, and an unwavering commitment to making the world a cleaner, safer place. As Ivey International looks ahead, their innovative, technology-driven approach promises to continue driving advancements in environmental technology for years to come.

For more information about Ivey International and their ground-breaking technologies, visit *https://iveyinternational.com*.

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