

From materials to clean water: Growing companies from wet labs

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Access to clean water is one of the most important indicators of development. This water has to be affordable to make a meaningful impact to the society. Diverse variety of materials are important in accomplishing this objective. We have been studying the chemistry of nanomaterials from the context of delivering microbially and chemically safe drinking water. Creation of affordable materials for constant release of silver ions is one of the most promising ways to make water microbially safe. Combining the capacity of diverse nanocomposites to scavenge toxic species such as arsenic, lead, and other contaminants along with the above capability can result in affordable, all-inclusive drinking water purifiers that can function without electricity. The critical problem in achieving this is the synthesis of stable materials that can release or adsorb ions continuously in the presence of complex species usually present in drinking water that deposit and cause scaling on nanomaterial surfaces. We have shown that such constant release/adsorbing materials can be synthesized in a simple and effective fashion in water itself without the use of electrical power. The nanocomposite exhibits river sand-like properties, such as higher shear strength in loose and wet forms. These materials have been used to develop an affordable water purifier to deliver clean drinking water at Rs. 130/y per family. The ability to prepare nanostructured compositions at near ambient temperature has wide relevance for adsorption-based water purification. We have implemented such solutions already in arsenic affected areas of India. We are now providing arsenic free water to 1000,000 people everyday with such materials. Translation of our results led to the incubation of multiple companies and two of them have their own manufacturing units now. A healthy mixture of basic science, applications and business in the Indian context is manifested here. Several new technologies are in the pipeline, a sample of these will be presented.

Some indicative references

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