chemistry

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WATER PURIFICATION

New method to clean water

In water purification chlorine is frequently converted to chloramine compounds, which are relied upon to do the actual disinfecting. But chloramines are slow killers of microorganisms and a relatively large amount of time must elapse before disinfection is achieved. This creates a he-who-drinks-last-drinks-best situation.

Dr. Riley N. Kinman of the University of Cincinnati has a way to overcome the problem. His idea is to use chloramines to convert soluble potassium iodide into iodine, which will then do the disinfecting. The mechanics of preparing seed solutions are easier with the iodide salt than by adding elemental iodine directly. Tests by Dr. Kinman show that a combination of chloramines and potassium iodide will kill bacteria at a faster rate than chloramines alone, thus overcoming the time problem. Dr. Kinman advocates his method for disinfecting reservoirs, industrial waste water and sewage water.

SILICONES

Membrane for roofs

The results of three to eight years of laboratory field and outdoor control tests have demonstrated the exceptional performance of silicone membranes as roof coverings, reports Warren R. Lampe of the Silicone Products Department of General Electric Co., Waterford, N.Y.

GE envisions the rubber-like silicone membrane as a replacement for asphalt in roof protection. Silicone membranes .022 inch thick can provide the same protection as two to four inches of asphalt, says Lampe. Because silicone membranes are flexible, they are not cracked by small expansions, contractions or shifts in underlying roof surfaces. This flexibility makes them water tight.

In addition, the porous membranes form a breathing system that expires water instead of collecting it, he says.

COAL

Insight into coal formation

For years scientists have been trying to understand the natural mechanism of coal formation. The latest insight into the process comes after two years of work by Dr. R. A. Friedel and co-workers at U.S. Bureau of Mines, Pittsburgh, Pa.

Dr. Friedel heated cellulose and pine sawdust in low-pressure tubes at 200 degrees C. for two years. Previous experiments heating such materials for a few hours at 300 degrees C. produced scorched noncoal-like substances.

But after two years the starting material was analyzed and found to resemble primitive bituminous coal. The experiment demonstrates that time is as important as heat in coal formation, with pressure playing a minor role. Since hundreds of millions of years have been available for making coal, nature could have done it at temperatures perhaps as low as 100 degrees C.

HEMODIALYSIS

Smaller kidney machines closer

A significant step closer to a more compact and cheaper home kidney machine has been taken with the development of new ultrathin cellulose membranes, says Dr. Robert J. Petersen of North Star Research and Development Institute in Minneapolis. Present kidney machines are about the size of a single bed and cost $4,000 to $5,000.

The new membranes are made from nitrocellulose, the nitrogen groups of which are removed after membrane fabrication by ammonium sulfhydryl. Previous membranes made of a cellophane material were .0005 of an inch thick; the new membranes are less than a tenth that thick.

The semipermeable membranes promise more efficient waste material removal and will permit greater control over water removal.

PHEROMONES

Boll weevil lure ready

The chemical elucidation of a new boll weevil sex attractant is nearly complete and full-scale testing is planned for this summer.

The attractant is composed of four chemical compounds obtained from male boll weevils and found in their feces, reports J. H. Tumlinson of the U.S. Department of Agriculture's Boll Weevil Research Laboratory at Mississippi State University. Three of the compounds have been synthesized and the synthesis of the fourth is in progress.

The attractant, as yet unnamed, has the added advantage of luring both males and females who can then be destroyed in one area by insecticides. In the field tests workers will be evaluating its long-distance attracting ability.

ANOMALOUS WATER

Strange water question

Doubts have been raised about the existence of anomalous water (SN: 1/25, p. 86). First announced in 1966 by Soviet scientist Prof. Boris V. Derjaguin, anomalous water is made by evaporating and then condensing water into capillaries only a few microns in diameter. The resulting water is called anomalous because its properties differ from those of regular water.

Dr. J. A. Schufle of New Mexico Highlands University now reports that scientists at Los Alamos Laboratory, using an electron microprobe, have found potassium and sulfur contaminants in anomalous water made from the usual potassium sulfate starting solution. Although Prof. Derjaguin's original work did not use potassium sulfate, no one has tried to duplicate it and test its product.

Dr. Schufle emphasizes that anomalous water may still exist, but the present method of making it has to be scrapped.