

New applications

New industrial applications of radioisotopes now under development assure additional contributions of isotopes technology to industry and our national economy. A brief discussion of some of these may be of interest.

In the field of radiation processing, the AEC, together with the Bureau of Reclamation and the Office of Saline Water, is developing the technology for the production of concrete-polymer materials. This product is prepared similarly to wood-plastics; i.e., the preformed, set concrete is impregnated with a monomer which is then polymerized in situ with radiation. Remarkable improvements in properties have been obtained, for example:

1. Compressive strength increased nearly 300% or a factor of almost four times the compressive strength of untreated concrete.
2. Tensile strength increased nearly 300%.
3. Modulus of elasticity increased 80%.
4. Modulus of rupture increased 250%.
5. Resistance to freezing and thawing disintegration was improved by over 300%.
6. Water permeability decreased to negligible values.
7. Water absorption decreased as much as 95%.
8. Corrosion by distilled water and sulfate brines was reduced to negligible values compared with the severe attack observed on untreated concrete.

Potential applications of concrete-polymer materials include concrete pipe for transportation of irrigation water, sewage, and municipal and industrial water; construction material for low-cost housing, desalination plants, and underseas structures; and fabrication of prestressed concrete pressure vessels for nuclear reactors. In addition, there may be architectural and aesthetic applications because dyes can be incorporated into the monomer, producing a variety of colors. Although there must be additional research and development, industrial interest is already evident, and private plans are being formulated for commercial production.

In another project the technology for radiation-induced emulsion polymerization has been demonstrated, and a pilot plant is producing vinyl acetate paint latex using this technology. Although production