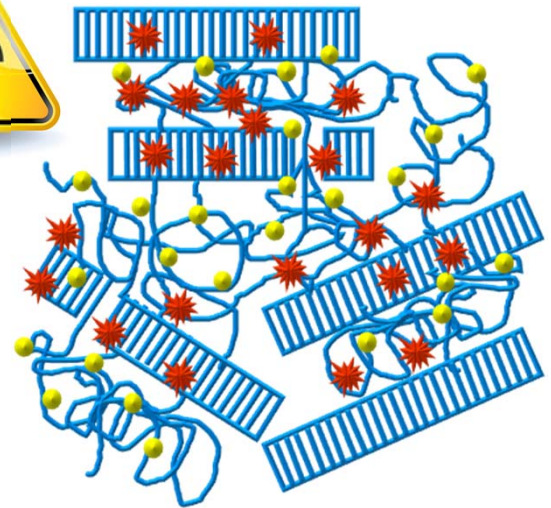




Set your radicals free

Summary

The presence of free radicals in materials is not generally considered desirable. These radicals arise from reactions in the material that leave unpaired electrons behind. These radicals are generally unstable and eventually will recombine and disappear, or will react with other chemical species. The mechanism by which these radicals decay can potentially influence the performance of the material. In polyethylene used in orthopedics, free radicals are deliberately introduced during the radiation-induced crosslinking process, but after this step, residual free radicals are highly undesirable because they can lead to oxidation and degradation. Being able to detect and quantify these radicals is critical for determining stability of the material and for quality control. ESR is the only technique that directly measures free radical content.



Uses

Biomedical • Engineering Materials • Consumer Products • Food • Beverages

Description

Electron Spin Resonance (ESR) instruments can directly measure free radical concentrations down to 10^{14} spins/g depending on the material. CPG has developed suitable calibration methods to allow reliable and accurate quantification across a range of concentrations of interest to the orthopaedic community for polyethylene. The ESR system can be used to assess the location of free radicals, and to show the resistance of materials to forming free radicals when exposed to ionizing radiation or other chemical reactions.

