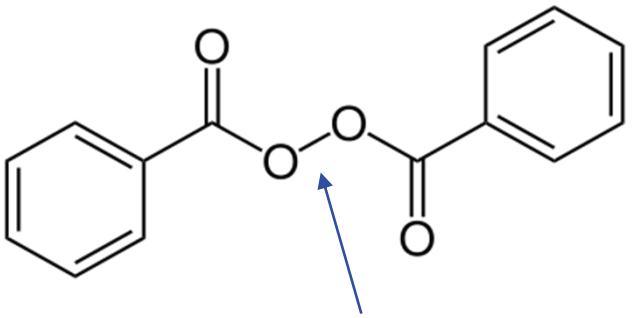
Benzoyl peroxide determination

Summary

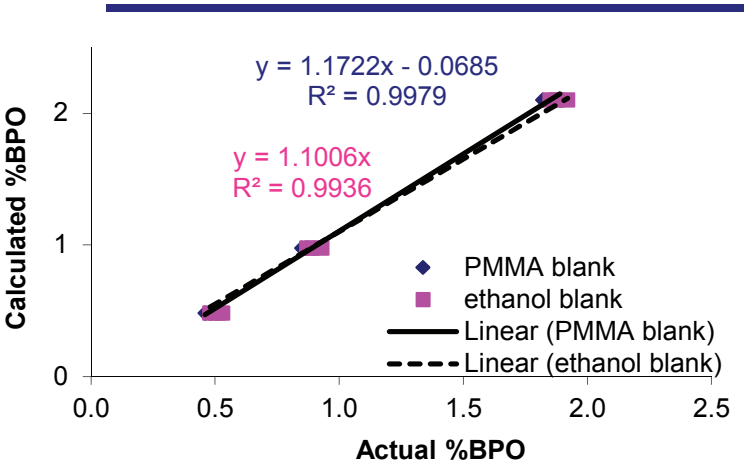
Benzoyl peroxide (BPO) is added to bone cement as a radical initiator for the methyl methacrylate monomer. BPO is highly reactive and degrades readily, with a temperature dependent half-life of one hour at 92 °C and one minute at 131 °C. The degradation products, benzoic acid and oxygen, are not significantly toxic, but the BPO remaining to initiate the polymerization is decreased, leaving unreacted monomer in the cement, and the potential for incomplete cure.

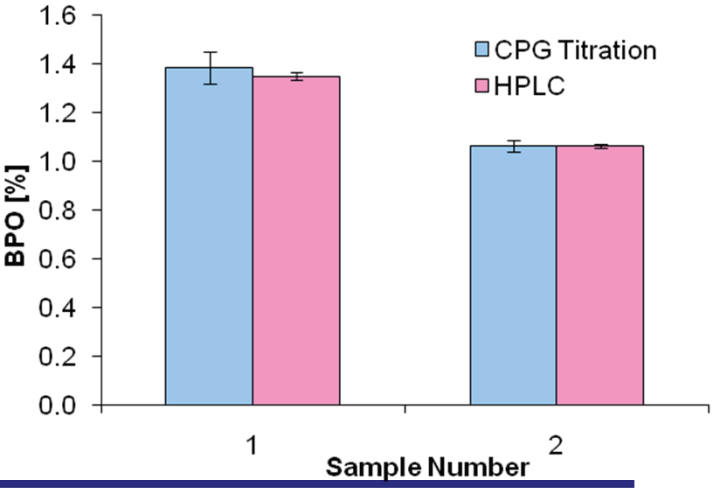


Benzoyl peroxide (BPO) splits at the O-O bond forming two radicals

Description

Common methods for the measurement of BPO in the powder are through HPLC, UV-Vis or titration. A method for titration developed at Cambridge Polymer Group, based on ASTM F451, resulted in data in close agreement with that obtained through HPLC, as shown, but with improved simplicity and substantially reduced cost. Although HPLC will continue to be the gold standard, this titration method allows simple wet-chemistry to be used to quantitatively determine BPO concentration in a sample. Since BPO is known to degrade with time, this assay will prove invaluable for long-term tracking of bone cement efficacy and storage-induced deterioration.





Uses

- Reaction chemistry
- Quality control
- Biomedical materials
- Bone cements

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- **Validate and verify manufacturing processes**
- **Perform root-cause analysis in product failures**

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