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**Intellectual Property
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Fluoride-Calcium-Phosphate Compositions and Dental Products

ADASRI Case # 06-0001

Background

Fluoride is well known to be effective in the prevention of dental caries by reducing demineralization and promoting remineralization. It is widely used in compositions in the form of toothpastes, gels, rinses and varnishes. The prevention of caries from the use of these products is due to their ability to deposit fluoride in plaque and saliva and also on the surfaces of teeth and other tissues. However, existing compositions generally produces very small amounts of orally retained fluoride compared to the total fluoride content of the product.

Invention Description

The compositions in this invention allow high concentrations of all three tooth mineral ions in a single, stable solution that becomes sufficiently unstable in the oral cavity to cause precipitation of calcium, phosphate and fluoride ions on the surfaces in the mouth. The amount of fluoride retained in the mouth greatly exceeds that produced from gels or rinses with the same amount of fluoride, producing significantly greater remineralization effects or allowing reductions of the amount of fluoride required to yield comparable fluoride deposition. The compositions are also shown to reduce dentin permeability, which is useful for individuals with sensitive teeth.

Potential Applications

The compositions can be formulated with different fluoride content for home use and in-office use with applications including

- Topical gels
- Mouth rinses
- Dentifrices (tooth pastes)

Benefits and Advantages

- Greatly increased efficacy: up to 10X fluoride deposition for the same product fluoride content
- Maintains efficacy for reduced product fluoride content, overcoming fluorosis, and extending applicability to children's products
- Large labile calcium fluoride reservoir: allows extended fluoride release
- Reduced dentin permeability – ~90% reduction in hydraulic conductance to reduce tooth sensitivity, twice as good as existing products.
- Longer-lasting: compositions form fluorapatite, which is less soluble than tooth mineral itself in the oral environment.