Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Crystal Structure Properties of Human Teeth as a Function of Age[1] TH. LEVENTOURI, A. KYRIACOU, R. VENTURELLI, A. ANTONAKOS, E. LIAROKAPIS, V. PERDIKATSIS, Florida Atlantic University — We report on crystal structure studies of human teeth as a function of age in the range of 5-87 years. The crystallinity of the hydroxyapatite, which is the main dental mineral phase in teeth, decreases with age in a systematic way starting at $\sim$ 40 years old teeth. The average crystallite size decreases from $\sim$40 nm to $\sim$12 nm in the age range 30 to 60 years old and then it remains practically constant. The a-lattice constant decreases in a similar systematic way and it is associated with the carbonate content of the tooth. Development of the secondary phases with the tooth-age questions the crystallographic structure of the dental apatite. FTIR spectroscopy reveals both types of carbonate substitution, but B-type substitution is greater by a factor of 4 than the A-type. An increase of the carbonate content with the tooth age is also deduced from the ratio of the v_2 CO_3 to the v_1 PO_4 IR modes from 17 to 70 years of age. TGA measurements confirm the results of both experimental methods.

[1]Support from the Cancer Institute at the FAU Research Park is acknowledged.

Th. Leventouri
Florida Atlantic University

Date submitted: 29 Nov 2007 Electronic form version 1.4