

A. Cuneyt Tas, Ph.D.

1993: PhD in Ceramic Sci. & Eng. (Iowa State, USA)
06/'93-11/'97: Assistant Professor (METU, Turkey)
11/'97-01/'02: Associate Professor (METU)
02/'99-02/'01: Visiting Professor (Max-Planck-Institut)
09/'01-04/'03: Senior Scientist (Merck, Germany)
05/'03-04/'06: Research Prof. (Clemson Univ., USA)
04/'06-11/'06: Professor (Mersin University, Turkey)
08/'07-06/'08: Visiting Prof. (New York Univ, USA)
11/'06-10/'10: Professor (Yeditepe University, Turkey)
10/'10-9/'11: Visiting Prof. (Univ. of Oklahoma, USA)

Publications

In peer reviewed journals: 57
(Science Citation Index) Citations: 1427
Symposium proceedings/abstracts: 122
Book chapters: 28
ICDD X-ray diffraction patterns: 18
Phase diagrams: 2

Patents

US Patents: 2, PCT Patents: 2
European Patents: 3, Canadian Patent: 1
German Patent: 1
British Patent: 1
Austrian Patent: 1
Turkish Patents: 9

Product-on-the-market

“Calcibon® Granules”: Micro- and macro-porous apatitic, bone-like calcium phosphate spherical granules (1 to 6 mm in diameter) used for the clinical repair of bone defects since 2003. These have been the first porous granules ever produced “at room temperature by using a self-setting, orthopedic cement material.” Granules were made by Dr. Tas at Merck Biomaterials GmbH in Darmstadt, and are currently marketed by Biomet Europe. See: http://www.cuneyttas.com/Calcibon-GPS_2_protocol.pdf, US Patent 7,381,262 and *J. Mater. Sci. Mater. Med.*, **19**(5), 2231-2239 (2008).

Awards / Honors

- Elected, Member/ International Centre for Diffraction Data (since May 1997)
- Faculty Excellence in Teaching Awards (METU), 1993, 1999, and 2000 (3000 USD each + certificate)
- Max-Planck-Society Scholarship (Feb1999-Feb2001)

Student Advising

- 12 graduate theses supervised & completed (5 in METU-Turkey, 5 in Clemson Univ.-USA, 2 in Max-Planck-Institut / Germany),
- >50 undergrads were assigned research projects

Contributions to Inorganic Materials Science

1.) Urea decomposition, catalyzed by its enzyme urease, is a regulated (in terms of concentration and supply) source of HCO₃⁻ ions in numerous synthesis solutions. This method was demonstrated by the author to produce Y(Cr, Co)O₃, BaFe₁₂O₁₉, LaAlO₃,

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Pb(Zr_{0.52}Ti_{0.48})O₃, Gd-doped CaZrO₃, Sr- and Zn-doped LaGaO₃, GaO(OH), Mn-doped ZnGa₂O₄ (Patent No: EP 1 227 139), CaCO₃, and biomimetic calcium phosphates.

2.) Synthetic body fluids (SBF), mimicking the blood plasma in terms of ion concentrations and pH stability, can *in situ* form nanosize calcium phosphate (CaP) particles (i.e., Posner clusters) since they are metastable-supersaturated solutions with Ca/P molar ratios of 2.5. Author has developed a Tris-buffered SBF solution back in 1997 (published in 1999, *J. Eur. Ceram. Soc.*) with a HCO₃⁻ concentration (i.e., 27 mM) exactly equal to that of human plasma. The author has developed a “10xSBF” solution (*J. Mater. Res.*, 2004) for “coating” a number of ceramics, polymers, or metals with a CaP layer to impart osteoinductivity to surfaces which would otherwise be bioinert.

3.) Been the first to synthesize carbonated, bonelike nanopowders (in bulk quantities) of calcium phosphates by using an SBF solution (*Biomaterials*, 2000) and/or enzyme-catalyzed synthesis (*J. Mater. Sci. Lett.*, 2001).

4.) Suggested, for the first time, to use DMEM cell culture solutions instead of SBF to test *in vitro* bioactivity of biomaterials (*Mater. Sci. Eng. C*, 2010)

5.) Showed that Tris- or Hepes-free SBF solutions can be prepared by using Na-lactate and lactic acid pair (Lac-SBF) (Pasinli et al., *Acta Biomater.*, 2010)

6.) Developed a single-step, aqueous chemical precipitation process for the manufacture of biphasic CaP nanopowders, which are used in the biomedical device manufacturing (*J. Am. Ceram. Soc.*, 1998).

7.) Synthesized hydroxyapatite powders of very high thermal stability, for the first time (*Biomaterials*, **21**, (2000) p.1429), which did not decompose into β-TCP

8.) Developed 3 different methods of synthesizing whiskers (i.e., single crystals) of calcium phosphate (either β-TCP or HA) biomaterials at <100°C or 1200°C (*J. Am. Ceram. Soc.*, 2001 & 2007 and *J. Mater. Res.*, 2004).

9.) Developed novel formulations of self-setting orthopedic cements for bone defect repair. These cements mimic the physicochemical properties of bone mineral: [1] *J. Mater. Sci. Mater. M.*, **16**, 167-74 (2005), [2] Patent No's: US 6,929,692 & US 7,381,262 [3] *Int. J. Appl. Ceram. Tech.*, **4**, 152-163 (2007).

10.) Prepared “biconvex micropills” of CaCO₃. Such micropills were not possible to synthesize prior to this work (*Int. J. Appl. Ceram. Tech.*, **6**, 53-59, 2009).

11.) Synthesized novel rhenanite-apatite biphasic biomaterials (*J. Biomed. Mater. Res.*, **80B**, 304-16, 2007).

12.) Synthesized, for the first time, water-lily or dumbbell-shaped bioresorbable brushite (CaHPO₄·2H₂O) crystals (*Mater. Sci. Eng. C*, 2010)