

Presentation of the Mineralogical Society of America Dana Medal for 2005 to William D. Carlson

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The Dana Medal of the Mineralogical Society of America recognizes "...continued outstanding scientific contributions through original research in the mineralogical sciences by an individual in the midst of their career." This year's recipient, Bill Carlson, joins the prestigious group of previous medalists: George Rossman, Mike Hochella, Mark Ghiorso, and Jim Kirkpatrick. He is in the same intellectual league with these giants, and is a natural addition to that exclusive group on all accounts.

Of course, Bill had the benefit of a first-class education at storied NCAA powerhouses—B.S at Stanford (1974) and Ph.D. at UCLA (1980). Immediately recruited to the University of Texas (Hook 'em, 'Horns!), Bill has spent his professional life thus far at Austin, where he is the Peter T. Flawn Professor. Bill has won five prestigious U. T. teaching awards and has devotedly served the University as Departmental Chair (1994–1996), and then Associate Dean for Academic Affairs (1996–2000).

The Dana Medal, however, recognizes his remarkably diverse research accomplishments in mineralogy-petrology-geochemistry. An insightful experimental mineralogist, early in his research career Carlson documented the influence of Sr-substitution and cation order-disorder on topotaxy and kinetics of the calcite-aragonite transformation. This was followed by definitive phase equilibrium investigations (some with Don Lindsley) of pyroxene binary solid solutions along the diopside-enstatite join, so important for upper mantle and lower crustal petrogenesis. Another major focus has been on the quantification of apatite fission-track annealing kinetics, placing that method on a firm theoretical foundation for exhumation rate studies by geochronologists and neotectonicians. Research progress on nucleation and both intergranular and intracrystalline diffusion-controlled growth of stable crystals has been substantially advanced through his cru-

cial support of the innovative, high-resolution X-ray computed tomographic facility at Texas, and its spectacular application to a wide range of metamorphic rocks. Carlson's solid-state investigations have elucidated the nature of the mineralogic growth substrate, and the dependence of porphyroblast enlargement rates on crystallographic orientations, surface/volume ratios, crystalline defects, and the compositions of carrier fluids. Recent work on disequilibrium textures in metamorphic rocks has shown that, whereas some components have reached stable configurations, others are massively metastable; moreover, sluggish intergranular diffusion appears to be the rate-limiting control on the attainment of phase equilibrium. Carlson has also collaborated widely with intra- and extramural colleagues on X-ray tomographic research, for instance, quantifying the skeletal parts of vertebrate fossils entombed in rocks, the spatial arrangement of minerals and breccia fragments in meteorites, the loci of diamonds in eclogites, and the architecture of feldspar networks in basaltic melts. With students, he has determined the subsolidus physical conditions attending metamorphism and thermal evolution of the Llano Uplift, central Texas. An imaginative study of bubble size and proportions in vesicular basalts extruded over time has allowed a totally independent method of assessing the problematic uplift history of the Colorado Plateau. All of Carlson's broad-ranging scientific contributions are characterized by remarkable versatility and creativity combined with a firm foundation in classical thermodynamics and modern rate theory. He is the complete mineralogist and, by his work, sets the highest research standards for our science.

Mr. President, it is an honor to present to you the Mineralogical Society of America Dana Medalist for 2005, William D. Carlson.