

## CHARACTERIZATION OF THE STRUCTURE AND COMPOSITION OF GECKO ADHESIVE SETAE: A MICRODIFFRACTION STUDY

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The ability of certain reptiles to adhere to vertical (and hang from horizontal) surfaces has been attributed to the presence of specialized adhesive setae on their feet. Structural and compositional studies of such adhesive setae will contribute significantly towards the design of biomimetic fibrillar adhesive materials. The results of electron microscopy analyses of the structure of such setae are presented, indicating their formation from aggregates of proteinaceous fibrils held together by a matrix and potentially surrounded by a limiting proteinaceous sheath. Raman microscopy of individual setae, however, clearly shows the presence of additional protein constituents, some of which may be identified as  $\alpha$ -keratins. Microbeam X-ray diffraction analysis has shown conclusively that the only ordered protein constituent in these structures exhibits a diffraction pattern characteristic of a well oriented  $\beta$ -keratin.