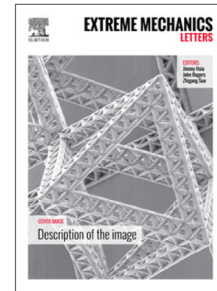


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**Attachment and Interfacial Strength between Twining Plants and the Support**Hang Chen<sup>1,2,3</sup>, Yingchao Zhang<sup>1,2</sup> and Xue Feng<sup>1,2\*</sup><sup>1</sup>AML, Department of Engineering Mechanics, Tsinghua University, Beijing 100084, China<sup>2</sup>Center for Mechanics and Materials, Tsinghua University, Beijing 100084, China<sup>3</sup>Guangzhou Institute of Building Science, Guangzhou 510440, China**Abstract:**

Twining plants, with their diverse attachment approaches to wind around a support, have attracted long-term attentions from different disciplines. The concept of fracture mechanics is employed to associate the local interfacial strength with the natural twining behavior of such spiral twining plant to fundamentally give an analytical view of the growth mechanism in this paper. It is shown that, to get more resources overhead and keep the stability of the structure, the characteristic geometric parameter of the helical structure is decided by the interfacial strength so that both maximum and minimum limitations of the support size are involved in their growth. The universal conclusion can be used to understand the biological features of them observed in previous experiment and provide a promotional idea for substance delivery, such as drug or treatment device, into the focus of infection of patients.

**Key words:** Twining Plants; Interfacial Strength; Fracture Mechanics; Structural Stability

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