

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Poster Session (P)

Author: Dr. Fan Zhang

Research & Development Center of China Academy of Launch Vehicle Technology, China,
zhang316fan@163.com

Mr. JIAN XU

China Academy of Launch Vehicle Technology (CALT), China, nuaaxj@163.com

Mrs. XIONG yanli

China Aerospace Science and Technology Corporation (CASC), China, xiongyanli0406@126.com

Mr. Yue Wang

China, wangjk1977@vip.sina.com

Dr. Jingqi Cai

China Academy of Launch Vehicle Technology (CALT), China, jingqicai@gmail.com

MICROSTRUCTURE ANALYSIS OF THREE-DIMENSIONAL FULL FIVE-DIRECTIONAL
BRAIDED COMPOSITES**Abstract**

Three-dimensional (3D) braided composites are a kind of advanced composites which are used in the aeronautical and astronautical fields more widely. In this paper, the shortages and disadvantages of the traditional 3D braided composites are analyzed, and possible improving approaches are presented, a new structure of composites is developed, which is 3D full 5-directional braided composite. In allusion to 3D full 5-directional braided composite, its four-step braiding technics is studied and realized, and the motion and space orientation of yarns in different control areas are described in detail. The geometric unit cell models of the 3D full five-directional braided composite are built on the above research. By means of analyzing the spatial configuration of yarns and establishing reasonable assumptions, the fiber volume content of the 3D full five-directional braided composites is calculated, and the relationships between the fiber volume content and braiding technics parameters are analyzed. This paper lays the foundation for mechanical properties research of the material.