## 4、 外语能力证书

# 全国大学英语四级考试
# 成绩报告单

CET®

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**笔　试**

准考证号：[redacted]

考试时间：2023年6月

| 总分 | 听力 (35%) | 阅读 (35%) | 写作和翻译 (30%) |
|---|---|---|---|
| 471 | 160 | 170 | 141 |

**口　试**

准考证号：--

考试时间：--

| 成绩 | -- |
|---|---|

成绩报告单编号：[redacted]

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教育部教育考试院

证书专用章

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**大学英语四级口语考试能力描述**

| | |
|---|---|
| 优秀 | 能用英语就熟悉的话题进行有效的交流；能清晰地叙述或描述一般性事件和现象。语言表达清楚连贯。 |
| 良好 | 能用英语就熟悉的话题进行交流；能叙述或描述一般性事件和现象。语言表达基本准确。 |
| 合格 | 能用英语就熟悉的话题进行简单交流；能简单叙述或描述一般性事件和现象。 |

5、 学术能力证明材料

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# Directionally arranged flexible bamboo/rubber materials with high cushion performance

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ABSTRACT

Composites derived from plant fibers are promising reinforcing materials for engineering because of their renewable and easily available characteristics. In this study, a simple pretreatment method was developed to fabricate structurally intact bamboo cellulose scaffolds. Water-stable, flexible, impact-resistant, and high damping ratio bamboo-based rubber composites were synthesized using carboxylated styrene-butadiene latex-impregnated 3D bamboo scaffolds. The composites were prepared by "Ethanol dehydration-delignification-polymer redistribution" strategy. The bamboo cellulose aggregate state structure and multiple crosslinked networks in the composite systems endowed the composites with strong mechanical and damping properties. The prepared composites had a high tensile strength, 67 times that of pure rubber (101.58 MPa and 1.25 MPa), which is higher than that of reported polymer-based vibration-damping materials, and the hydrostability was also significantly improved. The composites exhibited the characteristic viscoelasticity of polymers, with a recovery angle of 132° after 1000 extreme 180° flexion tests. More importantly, composites maintain a higher effective damping factor (Tan δ — 0.5) at room temperature. These bamboo-based rubber composites with excellent comprehensive performances have great potential for engineering applications, particularly for vibration damping, lightweight design, and flexible materials.

## 1. Introduction

Environmental protection and sustainable development have attracted considerable attention worldwide. Energy-efficient and vibration-reducing green structural materials play an increasingly important role in a range of engineering fields, including construction, automotive, and rail transportation [1–3]. Traditional materials such as stainless steel and alloys face many challenges when used for vibration isolation. These include a lack of damping effect, high manufacturing energy consumption, and nonrenewable energy consumption [4]. Therefore, it is important to develop environmentally friendly and renewable materials with low energy consumption for vibration damping.

The energy dissipation of polymeric elastomers results from the dynamic reversible damage caused by their interaction forces. This provides excellent damping properties [5]. Additionally, the supramolecular chain structure of polymers has a wide range of applications for structural connectivity [6]. Rubber is frequently produced as a supramolecular polymer for sound insulation and vibration damping and as a protective mat between mechanical fixtures [7,8]. In the field of engineering, the incorporation of waste rubber granules into concrete allows the achievement of properties such as energy absorption, sound insulation, and elasticity. The proportion of rubber added was controlled to improve the toughness and damping ratio to satisfy the requirement for vibration damping [9]. The strength of the rubber comes from the addition of inorganic fillers (multiwall carbon nanotubes [10], carbon

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