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Silicon Microsensors and Microactuators

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Recent progress in microfabrication, microsensor, and microactuator technologies is reviewed with emphasis on the past five years. To illustrate the major advances in the field, examples are selected from the literature and from the research at the Electronics Design Center of Case Western Reserve University, which has been active in the transducer field for over twenty years. Future trends from the authors' point of view are discussed.

1. Introduction

Microsensor and microactuator technologies have made significant advances in device design, fabrication, materials, testing, packaging, and applications. In recent years, many symposiums and conferences have been organized to report on the progress being made.[1] The field of solid-state transducers is application-driven and technology-limited. Therefore, it is emerging as an interdisciplinary field which involves many areas of science and engineering. We believe that, as the field matures, it will maintain its interdisciplinary nature. As a result, the related scientific information will be scattered over a broad spectrum of publications and will require a broad background to understand fully. Therefore, periodic reviews of at least segments of the field are desirable.

This paper provides a summary of the field based on the experience of the authors. Recent major developments in microfabrication technology (i.e., micromachining) as well as silicon-based microsensors and microactuators are highlighted below. With a finite effort and a limited space, one cannot hope to