Preface

The thoughts of making a theoretical textbook style book in electroactive materials began when I started getting more students in the laboratory. When new students join the project, I invariably give them a stack of journal articles to wade through, so began thinking how helpful it would be to give them a concise book to start with. This book is designed as a starting point, particularly to get a handle on “how does electroactive movement happen?”

The goal of this book was to capture the theory—how electroactivity works—balanced with applications—how can electroactivity be used, drawing inspiration from our manmade mechanical world and the natural world around us. This book takes a small step at capturing the fascinating field of electroactive materials and actuators. I’m already putting thoughts together on how to make the second volume even more informative while retaining concision and clarity.

The Artificial Muscle Project draws people from a variety of disciplines. Indeed, the field of electroactivity is extremely interdisciplinary. Case in point: for my first patent in this area, the examiner from the USPTO called me. Evidently, they had several meetings trying to decide which patent classification code it came under—chemistry or electrical engineering? So they resolved the matter by putting the question to me. We chatted and I agreed that it was on the fence between the two areas, but since my background was stronger in chemistry, the main classification was placed in class 523/113, synthetic resins, subclass composition suitable for use as tissue or body member replacement, restorative, or implant.

Fundamentally, the thorough understanding of electroactivity is important because of the ability of bending, contraction, and expansion to produce smooth, controllable, life-like biomimetic motion. By combining electroactive materials with fuel cells and other technologies, electroactive actuation and its reciprocal action can also provide for extremely energy efficient motion, energy generation, and energy harvesting. Electroactivity offers new ways of thinking about and configuring devices, machines, implants, and surfaces, for futuristic mobility by land, air, and sea.
Electroactivity in Polymeric Materials
Rasmussen, L. (Ed.)
2012, X, 162 p., Hardcover