

Many systems in nature can to a good approximation be considered as being disordered. Prominent examples reach from structural glasses or porous materials to biological systems such as living cells or actin networks. Transport in such systems is often anomalous, in many cases subdiffusive, but superdiffusive motion is also observed. Because of its importance for natural systems the following Part 3, consisting of four chapters, is devoted to *Anomalous transport in disordered systems*.

Disordered systems and their transport properties are notoriously difficult to deal with, even numerically. Therefore analytically solvable models play an important role in this field. The introductory contribution to this part by Jean-Phillipe Bouchaud is devoted to such models with emphasis on glassy behavior. Its title *Anomalous relaxation in complex systems: from stretched to compressed exponentials* indicates another fundamental aspect considered, namely the non-trivial interplay between anomalous relaxation and anomalous transport. In this context recent results for soft glassy materials and granular systems are highlighted. The second contribution by Walter Kob and his coworkers, *Anomalous transport in glassforming liquids*, basically reviews recent progress with a prototype model for structural glass formers, the binary Lennard-Jones fluid. For this model, which is generally accepted as capturing essentials of real glassforming liquids, molecular dynamics simulations give detailed insights into the microscopic processes involved in the self-organized emergence of disorder in these systems. In addition, it allows the testing of concepts such as mobile regions and basins in configuration space of these many particle systems and its signatures in measurable quantities. The third chapter in this part, *Subdiffusion limited reactions* by Santos Bravo Yuste, Katja Lindenberg, and Juan Jesus Ruiz-Lorenzo, introduces another important aspect into the field of anomalous transport, the possibility of reactions or transformations between e.g. chemical species. While reaction-diffusion processes for the case of normal diffusion and the governing partial differential equations are nowadays well understood, research on their analogue in case of subdiffusive processes, most relevant for disordered systems, is still in its infancy. This article reviews the state of the art and the unsolved problems in this field. The last contribution of this part by Karl Heinz Hoffmann and Jeanette Prehl considers in depth one of the important system classes leading to subdiffusive behavior, systems with an approximately fractal structure. In the chapter *Anomalous transport on disordered fractals* first the fundamentals of anomalous transport on regular fractals, including the possible numerical treatments are reviewed. Based on that, a

detailed study of the subtle influence of disorder within the fractal structure is presented. Among others it is explained how disorder, counter intuitively, may even enhance transport in comparison to the regular case. The shortcomings of fractional partial differential equations, as treated in Part 1 of this book, for the description of transport on fractals are pointed out and alternative approaches based on similarity groups are presented.