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The use of proteins for the formation of novel conductive polymers

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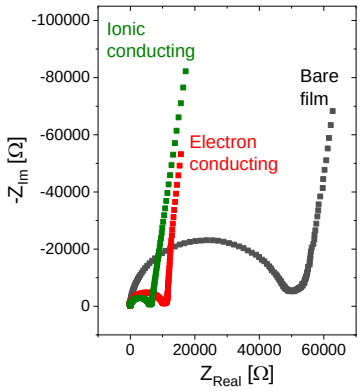
In the last couple of decades we witnessed the emerge of the conductive polymer field, where organic polymers are used for the formation of semiconductors. Inspired by the natural role of proteins in mediating electrons and ions in biological system, we offer a paradigm shift in the field, where instead of using synthesized organic molecules, we use natural proteins for the formation of electron and ionic conductors. For that purpose, we are using one of the most affordable protein of bovine serum albumin (BSA), which is one of the main side products of the bovine industry. We are developing a single pot method of taking the raw protein and to self-assemble it into a free-standing, self-supporting and insoluble transparent film, without the need of any equipment of heating. Using simple chemical modifications, we can control both the electronic conduction as well as the ionic conduction of the material, approaching conductivity levels of common conductive polymers. Our method can be considered as a breakthrough in the field, as it is very easy to form (no need of synthesis), very cheap, and due to the biological nature of the material also biocompatible and biodegradable.



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