



Fig. 6. (a) CDI profiles of solution conductivity vs time, (b) electroadsorption kinetics and (c) Ragone plots of DLC Super 30, KYP 50F and RH-AC electrodes in a 5 mmol L⁻¹ NaCl solution; (d) electroadsorption capacities in NaCl solution with different initial concentrations at 1.2 V.

Generally, the investigation of CDI electroadsorption performance using the different ACs showed a common decrease in conductivity after the electrical voltage was applied. Wherein, the electrode composites based on RH-AC exhibits the electroadsorption capacity of 20.05 mg g⁻¹ in 100 mmol L⁻¹ NaCl solution at 1.2 V, which is sufficiently higher than those of KYP 50F and DLC Super 30. Consequently, it has been established that an application of the carbonized and activated RH in producing electrode composites to be suitable for water desalination through the CDI technology.

4. Conclusions

It was shown that the CDI is a quick and efficient technology for the desalination of water with a low content of salt (up to 100 mmol L⁻¹). Moreover, within the scope of this study, we have investigated the CDI performances of different carbon

materials including the home-made porous carbon produced on the basis of RH, as well as two brands of commercial ACs represented by DLC Super 30 and KYP 50F. The application of chronoamperometry allowed us to evaluate the high reversibility and cyclability of CDI process within the same configuration of electrochemical cells. It is shown that the enhanced efficiency of salt removal can be obtained when the increased concentrations of salt are implemented. Besides, it is claimed that microporous carbons presumably possess high adsorption potentials which are particularly effective for use in CDI processes, although a certain amount of mesopores in carbon electrodes can be attractive to enhance the diffusion kinetics.

Our study shows that the manufacturing of low-cost ACs based on RH can be highly effective for application as electrode composites. In particular, the resulting porous carbons can be implemented to store the an energy in electric double layer and