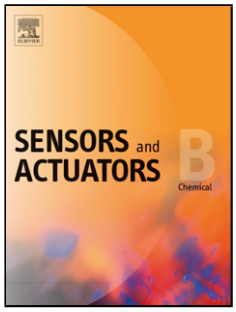


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# Polymer Selection Approaches for Designing Electronic Noses: A Comparative Study

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Highlights

- Sensor array response and LSER parameters are two approaches of polymer selection
- These selection approaches are compared using PCA with raw and standardized data
- Raw noise free sensor array response/LSER data results in optimum set of polymers
- Both result in same set of polymers for noisy/noise-free standardized data
- Simpler, less time consuming LSER approach is a better polymer selection approach

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**Abstract**

The chemical sensor array is a key unit of electronic noses and polymers are popular choices as the sensing materials. The selection of the polymers is an important aspect in designing the array. While the conventional approach for polymer selection which is based on the analysis of a large sensor array response (SAR) in smaller subsets of arrays is very well explored, relatively less attention has been given to another approach which is based on the LSER parameters of the polymers and the analytes. Although both of these approaches of polymer selection have independently shown to select the efficient subset of polymers, however the efficiency of the LSER parameters based approach has not yet been benchmarked with the conventional sensor array response approach. And this is the motivation of our work. In this paper we present a comparative analysis of these two approaches using the principal component analysis in combination with raw as well as standardized data, as a common method of polymer selection utilizing two SAW chemical sensor array response datasets available from the published literature. The study shows that the optimum sets of polymers are obtained with the raw noise-free SAR data but not with either the raw noisy data or the standardized (both noise-free/noisy) data. The same optimum sets are also obtained by the raw LSER parameters based approach which can be used as it is difficult to generate completely noise-free SAR data. The