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'HWHUPLQDWLRQ RI SDUDEHQV LQ FRVPHWLF VDPSOHV XVLQ KLJK SHUIRUPDQFH OLTXLG FKURPDWRJUDSK\ DQG XOWUDYL

$VKRN .XPDU 5DPDOLQJH[1], Heena .DXU[1], $EX]DU[2] and DEHUQHWK[2] *)XUWRQ
[1]Punjabi University, India
[2])ORULGD ,QWHUQDWLRQDO 8QLYHUVLW\ 86$

A simple, fast and sensitive analytical method using fabric phase sorptive extraction (FPSE) followed by high performance liquid chromatography ultraviolet detection (HPLC-UV) has been developed and validated for the extraction of ve parabens namely ethyl, methyl, propyl, butyl and benzyl paraben. Parabens are esters of p-hydroxybenzoic acid which ar commonly used as preservatives in cosmetic products. Various factors a ecting the performance of FPSE technique such a extraction time, eluting solvent, elution time and pH of the sample matrix were optimized. Determination was performed using reversed stationary phase C18 column with wavelength 254 nm. Separation was performed using mobile phase acetonitrile water (63:37; v/v) at an isocratic ow rate of 1.0 mL/min. e calibration curves of the target analytes were prepared with good correlation coe cient values (R2>0.992). e limit of detection (LOD) values range from 0.192-0.225 ng/mL and the developed method was applied successfully for the analysis of parabens in various cosmetic samples such as rose water, deodorant, ser and cream with extraction recoveries found in between 88% to 114%.

malik_chem2002@yahoo.co.uk

)LUVW SULQFLSOHV VWXG\ RI VLOR[HQH DQG JHUPR[HQH 6W GHIHFWV

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8QLYHUVLW\ RI &DPEULGJH 8.

Two-dimensional materials can be used in a variety of bioanalytical techniques. Interest in two-dimensional (2D) forms of Si and Ge has surged recently, with a focus on silicene and germanene, the Si- and Ge-based analogues of graphene well as their derivatives. Siloxene and germoxene are 2D materials made of honeycomb Si and Ge backbone sheets that decorated with H atoms and OH groups. is work uses rst-principles calculations to probe the properties of their various conformations. It is shown that the most stable siloxene (and germoxene) polymorph is the so-called washboard structure, and not the chair geometry assumed in previous studies. e stability of the washboard con guration relates to the formation of a network of hydrogen bonds between its hydroxyl groups. It is also found with hybrid functional calculations that siloxene and germoxene are wide band-gap semiconductors with gap values of 3.20 eV and 2.64 eV, respectively. Finally, we show th H and OH vacancies introduce spin polarization in these 2D materials and have a tendency to pair up in stable di-vacancies

aa852@cam.ac.uk