Refereed Publications – Planetary Exploration with Active Spectroscopic Techniques

(A) Stand-off Raman, LIF and LIBS Spectroscopy

1. Sharma, S. K., J. N. Porter, A. K. Misra, C. E. Helsley and D. E. Bates, Scanning time-resolved stand-off Raman instrument for large area mineral detection on planetary surfaces, *European J. Mineral.* **25**, 715-720 (2014). DOI: 10.1127/0935-1221/2013/0025-2303
2. Clegg, S. M., R. Wiens, A. K. Misra, S. K. Sharma, J. Lambert, S. Bender, R. Newell, K. Nowak-Lovato, S. Smrekar, M. D. Dyar, and S. Maurice, Planetary geochemical investigations using Raman and laser-induced breakdown spectroscopy, *Appl. Spectrosc.* **68,** 925-935 (2014).
3. Abedin, M. N., A. T. Bradley, S. Ismail, S. K. Sharma, and S. P. Sandford, Compact remote multisensing instrument for planetary surfaces and atmospheres characterization, *Appl. Optics*, **52**, 3124-3126 (2013).
4. Misra, A. K., S. K. Sharma, T. E. Acosta, J. N. Porter and D. E. Bates, Single pulse standoff Raman detection of chemicals from 120 m distance during daytime, *Appl. Spectrosc.* **66**, 1279-1285 (2012).
5. Sharma, S. K., A. K. Misra, T. E. Acosta and P. G. Lucey, Time-resolved remote Raman and fluorescence spectrometers for planetary exploration, in *Laser Radar Technology and Applications XVII*, Eds. Monte D. Turner and Gary W. Kamerman, *Proc. SPIE*, **8379**, 83790J/1-83790J/12 (2012).
6. Misra, A. K., S. K. Sharma, T. E. Acosta, J. N. Porter, P. G. Lucey, and D. E. Bates, Portable standoff Raman system for fast detection of homemade explosives through glass, plastic and water, in *Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing XIII*, Ed. Augustus Way Fountain III, *Proc. SPIE*, **8379**, 83790J/1-83790J/10 (2012).
7. Angel, S. M., N. R. Gomer, S. K Sharma, and C. McKay, Remote Raman Spectroscopy for Planetary Exploration: A Review, *Appl. Spectrosc.*, **66**, 137–150 (2012).
8. Porter, J. N., C. E. Helsley, S. K. Sharma, A. Misra, P. Lucey, D. Bates and B. R. Lienert, Two dimensional Standoff Raman measurements of distant samples**,** *J. Raman Spectrosc*. **43**, 165-167 (2012)
9. Sharma, S. K., A. K. Misra, S. M. Clegg, J. E. Barefield, R. C. Wiens, T. E. Acosta, D. E. Bates, Remote-Raman spectroscopic study of minerals under supercritical CO_2 relevant to Venus exploration, *Spectrochim. Acta*, A **80,** 75– 81 (2011).
10. Misra, A. K., S. K. Sharma, T. E. Acosta, and D. E. Bates, Compact remote Raman and LIBS system for detection of minerals, water, ices and atmospheric gases for planetary exploration, *Proc. SPIE*, **8032**, 80320Q/1- 80320Q/12 (2011).
11. Gomer, N., C. Gordon, P. Lucey, S. Sharma, J. Carter, and S. Angel, Raman Spectroscopy Using a Spatial Heterodyne Spectrometer: Proof of Concept, *Appl. Spectrosc.* **65**, 849-857 (2011).
12. Sharma, S.K., A.K. Misra, S. M. Clegg, J. E. Barefield, R. C. Wiens, and T. Acosta, Time-resolved remote Raman study of minerals under supercritical CO_2 and high temperatures relevant to Venus exploration, *Phil. Trans. Royal. Soc.* A, **368**, 3167 – 3191 (2010).
13. Sharma, S. K., A. K. Misra, T. E. Acosta, P. G. Lucey and M. Nurul Abedin, Compact Time-Resolved Remote Raman System for Detection of Anhydrous and Hydrous Minerals and Ices for Planetary Exploration, *Proc. SPIE*, **7691**, 76910F/1- 76910F/11 (2010).
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17. Garcia, C. S., M. N. Abedin, S. Ismail, S. K. Sharma, A. K. Misra, S. P. Sandford, and H. Elsayed-Ali, Design and build a compact Raman sensor for identification of chemical composition, *Proc. SPIE* **6943**, 69430I/1 - 69430I/7 (2008).

18. Chen, T., J. M. J. Madey, F. M. Price, S. K. Sharma, and B. Lienert, Remote Raman Spectra of Benzene Obtained from 217 Meters Using a Single 532 nm Laser Pulse, *Appl. Spectrosc*., **61**, 624-629 (2007).

19. Sharma, S. K., A. K. Misra, P. G. Lucey, R. C.F. Lentz, and C. H. Chio, Stand-off Raman Instrument for Detection of Bulk Organic and Inorganic Compounds, *SPIE Proc.* **6554**, 6554-04 (2007).

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26. Wiens, R. C., S. K. Sharma, J. Thompson, A. Misra, P. G. Lucey, Joint Analyses by Laser Induced Breakdown Spectroscopy (LIBS) and Raman Spectroscopy at Stand-Off Distances, *Spectrochim Acta* A, **61**, 2324-2334 (2005).

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(B) Micro-Raman Spectroscopy

1. Zinin, P. V., Y. Liu, K. Burgess, J. Ciston, R. Jia, S. Hong, S. Sharma, and L.-C. Ming, Elastic properties, sp^3 fraction, and Raman scattering in low and high pressure synthesized diamond-like boron rich carbides, *J. Appl. Phys.* **116**, 133519 (2014); doi: 10.1063/1.4897316

2. Kumar, A., S. Chaudhary, D. K. Pandya, and S. K. Sharma, Evidence of electron-phonon and spin-phonon couplings at the Verwey transition in Fe_3O_4 (magnetite), *Phys. Rev.* B, **90**, 024302/1 - 024302/8 (2014).

3. Bennett, C. J., S. J. Brotton, B. M. Jones, A. K. Misra, S. Sharma, R. I. Kaiser, A novel high sensitivity Raman spectrometer to study pristine and irradiated interstellar ice analogs. *Anal. Chem.* **85**, 5659–5665 (2013).

4. Acosta, T. E., E. R. D. Scott, S. K. Sharma, and A. K. Misra, Micro-Raman mapping of mineral phases in the strongly shocked Taiban ordinary Chondrite, *Amer. Mineral.* **98**, 859–869 (2013).

5. Chio, C. H., S. K. Sharma, L.-C. Ming, D. W. Muenow, Raman spectroscopic investigation on Jarosite–Yavapaiite stability, *Spectrochim. Acta*, A **75**, 162-171 (2010).

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11. Cooney, T. F., E. R D. Scott, A. N. Krot, S. K. Sharma and A. Yamaguchi, Vibrational spectroscopic study of minerals in the Martian meteorite ALH84001, *Amer. Mineral.* **84**, 1569-1576 (1999).