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Barium Vanadate Microspheres¹ SHARI YOSINSKI, LANDON TWEETON, STEVE FELLER, MARIO AFFATIGATO, Coe College — It has been found that many glass powders can form micro- or nanospheres when heated in a flame or by a laser. Much of the research in this area of microspheres has concentrated on making hollow spheres, called microballoons, of silica and borosilicate glasses. Our aim was to create highly porous barium vanadate microspheres for possible future applications in material storage. The surface area of porous spheres would provide a greater amount of bonding surface area for dopants than hollow spheres. Barium vanadate glass with a molar fraction of 0.4 to 0.6 barium oxide was used because this glass is stable and has a low Tg. Size distributions of the spheres were quantified and the extent of sphere formation and porosity was examined using a scanning electron microscope. The size of spheres formed is affected by powder size, dropping method, and flame position. The porosity of the microspheres is affected by flame temperature, time spent in flame, and the material onto which the spheres fall. The greatest porosity was achieved by first heating the glass powder at a low temperature and then immediately sending it through the flames of two MAPP gas torches at approximately 2100°C onto a metal sheet.

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