

Use of Titanium Tetrachloride as a Test for Water

- A. Pass a bottle of titanium tetrachloride into glove box
- B. Open the bottle inside the glove box, but be prepared to close the bottle immediately if you see smoke. For best results, hold a black-gloved hand behind the bottle: the white smoke will be better seen against the black background.
 - a. If smoke is observed, moisture exists at a relatively high level .
 - b. If no smoke is observed, the dew point is less than - 60°C (10 ppm).

Use of Diethylzinc as a Test for Oxygen

Materials used in the following test are pyrophoric when mixed -- use extreme caution in handling.

- A. Pass a bottle of diethylzinc, a bottle of heptane, and an empty bottle with cap into glove box.
- B. Mix a small amount of each material together in the empty bottle, but be prepared to cover the bottle immediately if smoke is seen. For best results, hold a gloved hand behind the bottle: the white smoke will be better seen against the black background.
 - a. If there is less than 5 ppm of oxygen within the glove box, the mixture will not emit smoke.
 - b. If smoke is seen, a relatively high amount of oxygen exists. Cap bottle immediately.

Use of $[\text{TiCp}_2(\text{NCCH}_3)_2]^+$ as a Colorimetric Indicator for Oxygen

$[\text{TiCp}_2(\text{NCCH}_3)_2]^+$ can be used as a colorimetric indicator for oxygen contamination in inert-atmosphere glove boxes. Small quantities of the blue solution are conveniently prepared by dissolving small (mg) amounts of TiCp_2Cl_2 in acetonitrile in a scintillation vial, adding zinc dust, and capping. Aliquots of this solution may be removed by disposable pipet and transferred to an open vial. Inspection of the aliquot gives a qualitative indication of the dioxygen level in the glove box. As the solution is exposed to trace O_2 the solution color changes from blue to green and ultimately, under higher dioxygen concentrations, to yellow.

J. of Chem. Ed., **1998**, 75, 459.