ADMMR

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THE ULTRAVIOLET LAMP AS A PROSPECTING TOOL

Program notes of May 9, 1986 by Ken A. Phillips, Chief Engineer

Prospecting with an ultraviolet light utilizes all the usual prospecting techniques and additionally takes advantage of the characteristic of certain minerals to fluoresce when irradiated with high energy, invisible, ultraviolet light.

Mineral commodities for which UV prospecting is useful:

Tungsten	Lead
Uranium	Lithium
Flourspar	Molybdenum
Barium	Zinc
Beryllium	Zirconium
Cesium	Rare Earths

Mineral commodities for which UV light can aid in diagnostic tests:

Uranium	Mercury
Columbium	Beryllium
Barite	Tungsten

What is UV light and fluorescence?

High energy invisible light
Luminescence (glowing) when activated by an energy source

Types of UV light:

Two types: long wave and short wave
Sometimes called or known as "Black Ray", "Black Light", or "Mineral Light"

When buying a lamp consider:

First: Short wave or
Second: Half short wave and half long wave, <u>NOT</u> all long wave
Third: Portable

A few comments about UV lamp use:

Short wave UV light will rapidly sunburn skin and eyes. Do not look directly at the light when it is on.
Short wave UV will not penetrate ordinary glass.
Purple or weak dark blue fluorescence is often just reflection of visible light.
Works best in total darkness.
Let your eyes adjust to the darkness 3 - 5 minutes.
Conserve batteries - they will be used up quickly.
Only about 500 minerals out of about 3000 identified species are known to be fluorescent - many of those only from certain localities.
A few, like scheelite always fluoresce.
The "purple" filter on the lamp is both fragile and expensive.

IMPORTANT MINERAL COMMODITIES FOR UV PROSPECTING

TUNGSTEN

Best commodity for UV prospecting.
Scheelite, calcium tungstate, is always fluorescent.
Most tungsten deposits have at least a trace of scheelite.
Scheelite is a heavy nonmetallic white to honey colored mineral similar in daylight appearance to quartz.
It has a distinctive brilliant blue fluorescence under short wave UV.
A fluorescent bead or halo test may help identify tungsten from non-fluorescent tungsten minerals.

URANIUM

Many uranium minerals fluoresce.
Autunite with its brilliant, yellow-green fluorescence is the most common.
Not all uranium minerals are fluorescent.
Most, if not all uranium occurrences have some fluorescent minerals.
Yellow-green fluorescence is the most common color.
A Geiger or scintillation counter are also useful.

FLUORSPAR

First recorded fluorescent mineral.
Gave its name to the property of fluorescence.
Often, but not always fluorescent.
Pale to deep blue fluorescence most common.
May be either short-wave or long wave.

BARIUM

Barite and witherite may both fluoresces a creamy white.
Barite, heated until red hot and then allowed to cool, will fluoresce yellow-orange.

BERYLLIUM

Beryl occasionally fluoresces a faint green to weak yellow.
Fluorescence is not very distinctive.

CESIUM

Pollucite, a cesium mineral sometimes fluoresces pink or white which may help distinguish it from quartz.

LEAD

Cerussite and anglesite both secondary lead minerals may be fluorescent.
Both are heavy and nonmetallic.

LITHIUM

Spodumene occasionally fluoresces orange or yellow.
Melted with a blowpipe, spodumene will fluoresce blue under short-wave.

MOLYBDENUM

Powellite fluoresces bright yellow under short-wave.

ZINC

Most zinc minerals may be fluorescent, but not always.
Hydrozincite and willemite are the most likely to be fluorescent.
Hydrozincite fluoresces blue white with phosfluorescence.
Willemite fluoresces green.

ZIRCONIUM

Zircon very often fluorescent a bright golden yellow.

PROSPECTING TECHNIQUES

Tools:

Short wave ultraviolet lamp.
Prospectors pan.
Maps.
Black tarp or blanket or dark lamping box.
Usual field tools.

Knowledge:

Mineral identification.
Geologic settings of ore deposits.
Map reading.
Record keeping.
Read about and study a few known occurrences. Visit one or more. Arrive before dark. Stay after dark to use portable UV lamp.

Take Samples:

Use a night survey to stake out fluorescent outcrops for daylight evaluation and sample cuttings. Be careful about judging ore values. A little fluorescent brilliance goes a long way.

GOOD LUCK !!!