

煙霧彈（英文：smoke grenade），是一種利用金屬罐承載的手榴彈，作為地對地發出訊號的用途，還可以作為空降地區或攻擊目標的訊號。另外，煙霧彈更作為掩護我軍行動的用途。但煙霧彈不是一種致命的武器，除非不正確的使用才會造成損傷。煙霧彈內部包含了一個鋼鐵容器，以及幾個專為放射氣體所製造的孔眼（位置在於煙霧彈的頭尾兩端）。其鋼鐵容器能夠容納 250 至 350 克的有顏色氣體（是一種由紅、綠、黃、紫四種顏色混合的混合物，用氯酸鉀(KClO_3)、乳糖和染料製成）。釋放出煙霧彈的時候會產生放熱反應，而且榴彈的內部亦會變得異常燙人，儘管煙霧彈裡的煙霧已經噴盡。

另一種煙霧彈是較為有爆炸性的，內部成分主要是白磷。這種煙霧彈一旦與空氣接觸的話，就會立即引爆，還會散發出一種顯眼的黃色火花，並且附帶著過量的白色氣體（白磷 P_4 ），這種爆炸力就等於兩個普通燃燒彈（燃燒彈是用來對付敵軍的武裝車輛，由手提式的榴彈發射器射出）。同時，使用者也必須注意當時的風向，以方便擊中目標。

很多人經常會將煙霧彈與氣榴彈混淆，氣榴彈是由一個外圍的熔線所連結的，與煙霧彈的導火線不同。而價錢方面，煙霧彈往往會比氣榴彈貴出 40 美元。另外，煙霧彈有時會在 paintball 或生存遊戲等場合裡使用，但不適用於軍方的活動

Smoke grenades are canister-type [grenades](#) used as ground-to-ground or ground-to-air signaling devices, target or [landing zone](#) marking devices, or a [screening](#) devices for unit movements. Smoke grenades are normally considered [non lethal](#), although incorrect use may cause injury or fatality. The body consists of a sheet [steel](#) cylinder with a few emission holes on top and at the bottom to allow smoke release when the grenade is ignited. The filler consists of 250 to 350 grams of [colored](#) (red, green, orange, gray, yellow, blue, white, black, or violet) [smoke composition](#) (mostly [potassium chlorate](#), [lactose](#) and a [dye](#)). The reaction is [exothermic](#) and grenade casings will remain scalding hot for some time even after the grenade is no longer emitting smoke.

Another type of smoke grenades are the bursting kind. These are filled with [white phosphorus](#) (WP), which is spread by explosive action. White phosphorus catches fire in the presence of air, and burns with a brilliant yellow flame, while producing copious amounts of white smoke ([phosphorus pentoxide](#)). These double as [incendiary grenades](#), and a variant of these are also launched from infantry-portable or [armored fighting vehicle](#)-mounted [grenade launchers](#). Users must also be wary of wind direction when using smoke grenades.

Smoke grenades should not be confused with [smoke bombs](#), which are typically started with an external [fuse](#) rather than a pin. Smoke grenades often cost much more at around \$40 [USD](#) compared to smoke bombs, which can often cost just a few cents.

Smoke grenades generally emit a far larger amount of smoke than smoke bombs that are sold as [fireworks](#).

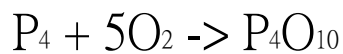
Smoke grenades are sometimes used in [paintball](#) or [airsoft](#) events, though these are not necessarily of military grade. Some devices utilised for the purpose of generating concealing smoke are high-volume [smoke candles](#).

Smoke compositions can be also used as an [aerosolization](#) vehicle for other materials than dyes; popular applications are in dispersion of [CN gas](#) or more commonly [CS gas](#), or in agriculture for dispersion of [insecticides](#).

Use

Used to create smoke screens, the grenades can be used to provide opportunity for movement over ground covered by fire. Smoke grenades can also be used to signal aircraft.

白磷（黃磷），分子式 P_4 ，白色固體，質軟，有劇毒，致死量為 0.25g。實驗室置於冷水中保存。常用於[化學武器](#)。40°C 時可在空氣中[自燃](#)，生成白色煙霧，主要成分為[五氧化二磷](#)（煙）以及五氧化二磷於空氣中水結合生成的[磷酸](#)（霧），方程式為：



武器

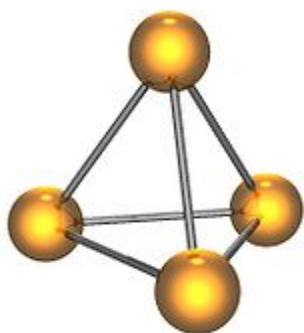
白磷彈是手榴彈、炮彈、炸彈的一種，利用了白磷在空氣中自燃的性質。利用白磷本身毒性的化學武器也曾被研製。起初白磷彈曾被當作燃燒彈使用，但後來由於其給交戰國士兵造成的巨大身體及心理創傷而逐漸被各國棄用，轉而作為目標指示彈及煙霧彈使用。2007 年以色列進攻[加薩](#)城時曾使用過該武器。

White phosphorus



White phosphorus sample

White phosphorus, or yellow phosphorus, or simply tetraphosphorus (P_4) exists as [molecules](#) made up of four [atoms](#). The [tetrahedral](#) arrangement resulting in [ring strain](#) and instability. The molecule is described as consisting of six single P-P bonds. Two different crystalline forms are known. The α form, which is stable under standard conditions, has a body-centered cubic crystal structure. It transforms reversibly into the β form at 195.2 K. The β form is believed to have a hexagonal crystal structure. ^[1]

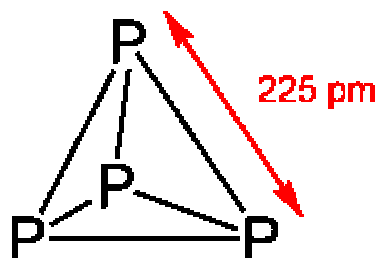


White phosphorus molecule

White phosphorus is a transparent [waxy](#) solid that quickly becomes yellow when exposed to light. For this reason it is also called yellow phosphorus. It glows greenish in the dark (when exposed to oxygen), is highly [flammable](#) and [pyrophoric](#) (self-igniting) upon contact with air as well as [toxic](#) (causing severe [liver damage](#) on ingestion and [phossy jaw](#) from chronic ingestion or inhalation). The odour of combustion of this form has a characteristic garlic smell, and samples are commonly coated with white "(di)[phosphorus pentoxide](#)", which consists of P_4O_{10} tetrahedra with oxygen inserted between the phosphorus atoms and at their vertices. White phosphorus is only slightly soluble in water and, indeed, it can be stored under water. It is, however, soluble in [benzene](#), [oils](#), [carbon disulfide](#), and [sulfur monochloride](#).

Production and applications

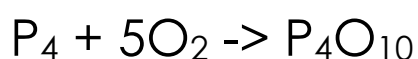
The white allotrope can be produced using several different methods. In one process, [calcium phosphate](#), which is derived from [phosphate rock](#), is heated in an electric or fuel-fired [furnace](#) in the presence of [carbon](#) and [silica](#).^[2] Elemental phosphorus is then liberated as a vapour and can be collected under [phosphoric acid](#).



Tetraphosphorus molecule

White phosphorus has an appreciable [vapour pressure](#) at ordinary temperatures. The [vapour density](#) indicates that the vapour is composed of P₄ molecules up to about 800 °C. Above that temperature, dissociation into [P₂](#) molecules occurs.

It ignites spontaneously in air at about 50 °C, and at much lower temperatures if finely divided. This combustion gives phosphorus (V) oxide:



Because of this property, white phosphorus is used as a weapon.