"Bath Salts" are usually a combination of the chemicals mephedrone and MDPV

Mephedrone, also known as **4-methylmethcathinone** (**4-MMC**), or **4-methylephedrone**, is a synthetic stimulant and entactogen drug of the amphetamine class. Slang names include *meph, drone, MCAT*. It is reportedly manufactured in China and comes in the form of tablets or a powder, which users can swallow, snort or inject, producing similar effects to MDMA, amphetamines and cocaine. Mephedrone was first synthesized in 1929 but did not become widely known until it was rediscovered in 2003. By 2007 mephedrone was reported to be available for sale on the internet, by 2008 law enforcement agencies had become aware of the compound and by 2010 it had been reported in most of Europe, being particularly prevalent in the United Kingdom. Mephedrone was first made illegal in Israel in 2008, followed by Sweden later that year. In 2010 it was made illegal in many European countries and in December 2010, the EU ruled it illegal across Europe. In Australia, New Zealand, the USA and Canada it is considered illegal as an analog of other illegal drugs and is controlled by laws similar to the Federal Analog Act.

Users have reported that mephedrone causes euphoria, stimulation, elevated mood, and overall effects similar to those of cocaine, amphetamines and MDMA. These effects last different amounts of time, depending on the way the drug is taken. When taken orally, users report they can feel the effects within 15–45 minutes, when snorted the effects are felt within minutes and peak within half an hour. The effects last for between two and three hours when taken orally or nasally, but only half an hour if taken intravenously. Out of 70 Dutch users of mephedrone, 58 described it as an overall pleasant experience and 12 described it as being an unpleasant experience. A survey of UK users, who had previously taken cocaine, found that most users found it produced a better quality and longer lasting high, was less addictive and carried the same risk as using cocaine.

Mephedrone can cause hallucinations, nausea, vomiting, blood circulation problems, rashes, anxiety, paranoia, and delusions. A survey conducted by the National Addiction Centre, UK found that 51% of mephedrone users said they suffered from headaches, 43% from heart palpitations, 27% from nausea and 15% from cold or blue fingers, indicative of vasoconstriction. Doctors at Guy's Hospital, London reported that of 15 patients they treated after taking mephedrone in 2009, 53.3% were agitated, 40% tachycardic, 20% had systolic hypertension, and 20% had seizures.

Pharmacology
Very little is known about the pharmacology of mephedrone. From the British Medical Journal, mephedrone is likely to stimulate the release of, and then inhibit the reuptake of monoamine neurotransmitters. The cathinone derivatives methcathinone and methylone, act in a similar way to amphetamines mainly acting on dopamine and norepinephrine transporters so it is expected that mephedrone also acts in this way. The actions of amphetamines and cathinones are determined by the differences in how they bind to dopamine, norepinephrine and serotonin transporters. Molecular modeling of mephedrone suggests it is more hydrophillic than methyl-amphetamines which may account for the higher doses required to achieve a similar effect, because mephedrone is less able to cross the blood-brain-barrier. The metabolism of mephedrone has been studied in rats and humans, with the metabolites being able to be detected in urine after usage. Nothing is known about the potential neurotoxicity of mephedrone, but scientists have suggested possible dangers associated with its use based on its similarity to other drugs. There have been no formal published studies into the effects of mephedrone psychological and behavioral effects of mephedrone on humans nor on animals from which the potential effects could be extrapolated. As a result, the only information available comes from users themselves and clinical reports of acute mephedrone toxicity.

Toxicity
As of March 2010, there have been no reported studies on the potential neurotoxicity of mephedrone nor is the median lethal dose known. In 2009, one case of sympathomimetic toxicity was reported in the UK after a person took 0.2 g of mephedrone orally and 3.8 g subcutaneously. The patient was treated with 1 mg of lorazepam and the sympathomimetic features decreased within 6 hours of treatment. The Swedish medical journal *Lakartidningen* reported that mephedrone could potentially cause the cardiovascular problems associated with the use of cocaine and amphetamines and serotonin syndrome associated with the use of ecstasy and LSD. One case of serotonin syndrome has been reported, where the patient was already prescribed fluoxetine and olanzepine and then took 40 tablets containing mephedrone in one night. He was treated

with lorazepam and discharged 15 hours after admission. Doctors who treated a 15 year old female suffering from mephedrone intoxication suggested in *The Lancet* that like MDMA, mephedrone may promote serotonin-mediated release of antidiuretic hormone resulting in hyponatraemia and an altered mental state. In another case, a 19 year old male was admitted to hospital suffering from inflammation of the heart, 20 hours after taking one gram of mephedrone. The doctors treating the patient stated it was caused by either a direct toxic effect of mephedrone on the heart muscle, or by an immune response. One case of acquired methaemoglobinaemia, where a patient had "blue-ish lips and fingers", has also been reported, after they snorted one gram of mephedrone. The patient started to recover after being hospitalized and it was not necessary to administer any medication.

Methylenedioxypyrovalerone (**MDPV**) is a psychoactive stimulant with properties that acts as a norpinephrine-dopamine reuptake inhibitor (NDRI). Reportedly, it has been sold since around 2008 as a research chemical. It is also known as Mtv, MDPK, Magic, Super Coke and Peevee. In 2010, it was reportedly sold as a legal drug alternative and marketed in the United States as "bath salts" in gas stations and convenience stores, similar to the marketing for Spice and K2 as incense. MDPV was then going under the street names of Cloud 9, Ivory Wave, Ocean, Charge Plus, White Lightning, Scarface, Hurricane Charlie, Red Dove and White Dove.

MDPV has no history of FDA approved medical use. Reportedly, it has four times the potency of methylphenidate (Ritalin). MDPV is the 3,4-methylenedioxy ring-substituted analog of the compound pyrovalerone, developed in the 1960s, which was used for the treatment of chronic fatigue and as an anorectic, but caused problems of abuse and dependence. However, despite its structural similarity, the effects of MDPV bear little resemblance to other derivatives such as MDMA.
MDPV acts as a stimulant and has been reported to have amphetamine-like or cocaine-type effects. The acute effects may include:

- physical: tachycardia, hypertension, vasoconstriction, diaphoresis
- mental: euphoria, increases in alertness & awareness, increased wakefulness and arousal, anxiety, agitation, and the perception of a diminished requirement for food and sleep.

The effects have a duration of roughly 3 to 4 hours, with after effects such as tachycardia and hypertension, and mild stimulation lasting from 6 to 8 hours. High doses have been observed to cause intense, prolonged panic attacks in stimulant-naïve users, and there are anecdotal reports of psychosis from sleep withdrawal. Extended binges on MDPV have also been reported to produce a severe “crash” syndrome similar to that of methamphetamine, characterized by depression, lethargy, dysphoria, headache, anxiety, and postural hypotension. Abdominal pain consistent with kidney pain has also been reported when MDPV is used for extended periods of time. MDPV use is also associated with temporary trismus and/or bruxism. Side effects are highly dose-dependent. No fatalities have so far been reported without the combination of other substances

Reported modalities of intake include oral consumption, insufflation (snorting), smoking, and IV use. It is supposedly active at 3–5 mg, with typical doses ranging between 5–20 mg.